Description of the 1999 lobster fishing effort along the western coast of Cape Breton (Lobster Fishing Area 26B)

Marc Lanteigne and Gilles Paulin

Department of Fisheries and Oceans Canada
Gulf Fisheries Center, Science Branch
P.O. Box 5030
Moncton, New Brunswick
E1C 9B6

2001

Canadian Industry Report of Fisheries and Aquatic Sciences 259

Fisheries and Oceans Pêches et Océans

Canada

259

Canadian Industry Report of Fisheries and Aquatic Sciences

Industry reports contain the results of research and development useful to industry for either immediate or future application. They are directed primarily toward individuals in the primary and secondary sectors of the fishing and marine industries. No restriction is placed on subject matter and the series reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries and aquatic sciences.

Industry reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is abstracted in *Aquatic Sciences and Fisheries Abstracts* and indexed in the Department's annual index to scientific and technical publications.

Numbers 1-91 in this series were issued as Project Reports of the Industrial Development Branch, Technical Reports of the Industrial Development Branch, and Technical Reports of the Fisherman's Service Branch. Numbers 92-110 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Industry Reports. The current series name was changed with report number 111.

Industry reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page. Out-of-stock reports will be supplied for a fee by commercial agents.

Rapport canadien à l'industrie sur les sciences halieutiques et aquatiques

Les rapports à l'industrie contiennent les résultats des activités de recherche et de développement qui peuvent être utiles à l'industrie pour des applications immédiates ou futures. Ils sont surtout destinés aux membres des secteurs primaire et secondaire de l'industrie des pêches et de la mer. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du ministère des Pêches et des Océans, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports à l'industrie peuvent être cités comme des publications complètes. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports à l'industrie sont résumés dans la revue *Résumés des sciences aquatiques et halieutiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les numéros 1 à 91 de cette série ont été publiés à titre de rapports sur les travaux de la Direction du développement industriel, de rapports techniques de la Direction du développement industriel, et de rapports techniques de la Direction des services aux pêcheurs. Les numéros 92 à 110 sont parus à titre de rapports à l'industrie du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 111.

Les rapports à l'industrie sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Canadian Industry Report
of Fisheries and Aquatic Sciences 259

2001

Description of the 1999 lobster fishing effort along the western coast of Cape Breton (Lobster Fishing Area 26B)

Marc Lanteigne and Gilles Paulin

Department of Fisheries and Oceans Canada
Gulf Fisheries Centre, Science Branch
P.O. Box 5030
Moncton, New Brunswick
E1C 9B6

Imprimé sur du papier recyclé

Printed on recycled paper

© Minister of Supply and Services Canada 2001
Cat. No. Fs 2001-14/259E ISSN 0706-3694

Correct citation for this publication:

Lanteigne, M. and G. Paulin, 2001. Description of the 1999 lobster fishing effort along the western coast of Cape Breton (Lobster Fishing Area 26B). Can. Ind. Rep. Fish. Aquat. Sci. 259

Table of contents

List of Tables v

List of Figures vi

Abstract viii

Résumé viii

1. Introduction 1

2. Description of the lobster fishery 2

2.1 Lobster Fishing Areas and management regime 2

2.2 Lobster landings 2

3. Material and methods 3

4. Results and discussion 4

4. 1 Participation level 4

4.2 Age composition and year of experience of fishermen 4

4.3 Fishing practices 5

4.3.1 Number of fishing hours per day 5

4.3.2 Number of traps during the last two weeks of the season 5

4.3.3 Quantity of bait used annually 5

4.3.4 Number of traps per string 6

4.3.5 Number of fishing days per week 6

4.4 Trap dimensions and designs. 6

4.4.1 Trap length 6

4.4.2 Trap width 7

4.4.3 Trap type 7

4.4.4 Trap internal design 7

4.4.5 Entrance diameter (hoop size) 8

5. Summary 8

6. Acknowledgements 9

7. References 9

101-04191/

List of Tables

		Page
Table 1.	Lobster conservation measures by Lobster Fishing Area (LFA) in the southern Gulf of St. Lawrence from 1998 to 2001.	10
Table 2.	Lobster management regime and characteristics in the southern Gulf of St. Lawrence in 1999.	10
Table 3.	Lobster landings (t) by statistical district for Lobster Fishing Area 26B, from 1984 to 1999.	10
Table 4.	Number of fishermen that answered and returned the questionnaire by homeport and statistical district, for Lobster Fishing Area 26B.	11
Table 5.	Age composition and basic statistics of the fishermen that answered the questionnaire by statistical district for Lobster Fishing Area 26B, with comparison with statistics obtained from the official licensing database.	12
Table 6.	Actual number of license holders by age class and statistical district obtained from the official licensing database. The questionnaire participation level for each age class is presented in parenthesis.	12
Table 7.	Starting years (5 years groupings) as captain of a lobster fishing vessel by statistical district for Lobster Fishing Area 26B.	13
Table 8.	Number of hours (grouping of 2 hours) required to fish the entire set of traps by statistical district, for Lobster Fishing Area 26B.	13
Table 9.	Percentage of traps being removed by fishermen during the last two weeks of the fishing season, by statistical district for Lobster Fishing Area 26B.	13
Table 10.	Average annual weight of bait used by fishermen in each statistical district for Lobster Fishing Area 26B.	14
Table 11.	Number of traps per string used by fishermen in each statistical district for LFA 26B.	14
Table 12.	Number of fishing days per week as reported by fishermen in each statistical district for Lobster Fishing Area 26B.	14
Table 13a.	Occurrences of the different trap lengths indicated by fishermen in each statistical district for Lobster Fishing Area 26B.	15
Table 13b.	Number of traps for the different trap lengths used by fishermen in each statistical district for Lobster Fishing Area 26B.	15
Table 13c.	Number of fishermen that indicated having one or more type of trap lengths in each statistical district, for Lobster Fishing Area 26B.	15
Table 14a.	Occurrences of the different trap widths used by fishermen in each statistical district, for Lobster Fishing Area 26B.	16
Table 14b.	Count of traps for the different trap widths used by fishermen in each statistical district in LFA 26B.	16
Table 14c.	Number of fishermen that indicated having one or more type of trap widths for each statistical district in Lobster Fishing Area 26B.	16

Table 15a.	Number of occurrences and percentages of the different trap types for each statistical district in Lobster Fishing Area 26B.	17
Table 15b.	Count of trap types for each statistical district in LFA 26B.	17
Table 15c.	Percentage of fishermen that indicated having one or more type of trap as part of their fishing gear, for each statistical district in LFA 26B.	17
Table 16a.	Number of occurrences for the different types of trap interior design used in each statistical district in LFA 26B.	17
Table 16b.	Count of traps for the different types of interior trap design used in each statistical district in LFA 26B.	18
Table 17.	Prevalence of single and double spindles (bait pins) in lobster traps, for each statistical district in LFA 26B.	18
Table 18a.	Number of fishermen for the different trap entrance diameter used in each statistical district in LFA 26B.	18
Table 18b.	Count of trap for the different trap entrance diameter used in each statistical district in LFA 26B.	18

List of Figures

		Page
Figure 1.	Lobster Fishing Areas (LFA) and statistical districts in the southern Gulf of St. Lawrence. The statistical districts in LFA 26B are underlined.	19
Figure 2.	Lobster landings in southern Gulf of St Lawrence from 1892 to 1999 (the 1999 data are preliminary). Catch data for LFAs 24, 25 26A were combined from 1892 to 1946, as they were not clearly differentiated between LFAs.	20
Figure 3.	Lobster landings in LFA 26B from 1947 to 1999.	20
Figure 4.	Lobster landings by statistical district in LFA 26B, from 1984 to 1999.	21
Figure 5.	Age composition of the fishermen that answered the questionnaire and comparison with the age composition obtained from the licensing database for statistical districts 2 and 3. Data from statistical district 14 are not presented because of the small number of fishermen (5) available	22
Figure 6.	Participation level (%) of fishermen for each age class in statistical districts 2 and 3. The actual number of lobster license holders and their age were obtain from the official licensing database. The horizontal line indicates the average participation level for the statistical district.	23
Figure 7.	Representation of the number of years of experience as captain of a lobster fishing vessel, by groups of 5 years and by statistical district. Data from statistical district 14 are not presented because of the small effective (5 fishermen).	24
Figure 8.	Percentage of fishermen that indicated removing traps in the last two weeks of the fishing season, by statistical district in LFA 26B.	24

Figure 9.	Number of trap per string used by fishermen (%), by statistical district in LFA 26B.	25
Figure 10a.	Relative frequency (%) of the number of occurrences for each trap length grouping, by statistical district in LFA 26B.	25
Figure 10b.	Relative frequency (%) of the number of traps for each trap length grouping, by statistical district in LFA 26B.	26
Figure 11.	Percentage of fishermen that indicated using one or more trap length, by statistical district in LFA 26B.	26
Figure 12a.	Relative frequency (%) of the number of occurrences for each trap width grouping, by statistical district in LFA 26B.	27
Figure 12b.	Relative frequency (%) of the number of traps for each trap width grouping, by statistical district in LA 26B.	27
Figure 13.	Relative frequency (%) of the occurrence of the different trap types, by statistical district in LFA 26B.	28
Figure 14a.	Relative frequency (%) of the occurrence of the different types of interior trap designs, by statistical district in LFA 26B.	28
Figure 14b.	Relative frequency (%) of the number of traps for each different type of interior trap design used by fishermen, by statistical district in LFA 26B.	29
Figure 15a.	Relative frequency (%) of the occurrence of the different trap entrance diameter, by statistical district in LFA 26B.	29
Figure 15b.	Relative frequency (%) of the number of traps for each category of trap entrance diameter used by fishermen, by statistical district in LFA 26B.	30

List of Appendices

		Page
Appendix I.	Lobster commercial landings in metric tons (t) for each Lobster Fishing Area (LFA), from 1892 to 1999. Catch data for LFAs 24, 25 and 26A were combined, as they were not clearly differentiated between LFAs, from 1892 to 1946.	31
Appendix II.	Questionnaire for fishermen in Lobster Fishing Area 26B.	34

Abstract

Lobster Fishing Area (LFA) 26B consists of the western coast of Cape Breton, from Aulds' Cove to Meat Cove. This LFA is the smallest of the southern Gulf of St. Lawrence in terms of area (approximately 613 km^2) and number of fishermen (253 license holders) but has the largest legal minimum carapace size (70.0 mm or 2 3/4 inches) of the southern Gulf of St. Lawrence.

With the objective of obtaining quantitative information on the lobster fishing effort in LFA 26B, a written questionnaire was distributed to all lobster fishermen in LFA 26B. The questionnaire was directed towards the fishing practices in general and the lobster trap types, designs and dimensions used. Local fishermen, DFO Science and Management representatives took part in the preparation of the questionnaire and the survey in an effort to better understand the fishing effort in LFA 26B and to identify new and innovative conservation measures for this particular LFA. The questionnaire was distributed to all fishermen when they were acquiring their regulatory trap tags or by mail.

LFA 26B is composed of three statistical districts; 2, 3 and 14. Statistical districts 2 and 3 are corresponding to the northern and southern section of LFA 26B respectively. While statistical district 14 is a small area inside St. Georges Bay and consists of only 5 fishermen. Results are presented for the whole LFA 26B as well as by statistical districts.

Key words: American lobster, *Homarus americanus*, fishing effort, fishery's description.

Résumé

La Zone de Pêche du Homard (ZPH) 26B comprend la partie ouest de la côte du Cap Breton en partant de Auld's Cove jusqu'à Meat Cove. Cette ZPH est la plus petite en terme de superficie (approx. 613 km^2) et en nombre de pêcheurs mais possède la plus grande taille minimale légale (70mm) de tous les ZPH dans le sud du golfe du St Laurent.

Un questionnaire a été envoyé à tous les pêcheurs de homards de la ZPH 26B afin d'obtenir de l'information quantitative sur leurs habitudes de pêche au homard. Les questions, préparées conjointement par les pêcheurs, les scientifiques du MPO et les représentants de la gestion, portaient principalement sur les habitudes de pêche au homard et sur les types d'engins de pêche utilisés. Le questionnaire a été distribué à tous les pêcheurs lorsqu'ils allaient se procurer les étiquettes réglementaires pour leurs casiers ou par courrier.

La ZPH 26B est composée de trois districts statistiques : 2, 3 et 14. Les districts statistiques 2 et 3 correspondent aux sections respectives nord et sud de la côte ouest du Cap Breton. Le district statistique 14 représente une petite région à l'intérieur de la Baie St. Georges et ne regroupe que cinq pêcheurs de homard. Les résultats sont présentés pour l'ensemble de la ZPH 26B et par district statistique.

Mots clés: Homard, *Homarus americanus*, effort de pêche, description de la pêcherie.

1. Introduction

In November 1995, the Fisheries Resource Conservation Council (FRCC) presented their report entitled "A Conservation Framework for Atlantic Lobster" (FRCC, 1995). The FRCC concluded that the present fisheries were operating at high exploitation rates, harvesting primarily immature animals and did not allow for adequate egg production. Implement of a new conservation framework was recommended which consisted mainly of increasing the overall egg production along the Atlantic coast. A target of egg production per recruits (E/R) equivalent to 5% of that of an unfished population was specifically recommended.

In response to the FRCC, the Department of Fisheries and Oceans (DFO) introduced new measures to double the E/R in the southern Gulf in 1998 (often referred as doubling the egg production). In 1998, because each Lobster Fishing Area (LFA) had different management regime, they also had different initial value of E/R. Because of their various fishing management regimes, the doubling of E/R resulted in different conservation measures for each LFA. The implementation of these new conservation measures was spread over a period of four years (Table 1).

The minimum legal carapace size of 70 mm in place for LFA 26B is the largest in the southern Gulf (Table 1). Therefore, the requirement of doubling of the E/R in the four-year management plan for LFA 26B was based entirely on the V-notching of 50% of egg bearing females caught in traps. Unfortunately, the actual benefit of increasing E/R with V-notching has been highly criticized by fishermen and little effort has been done in 1998 and 1999 to comply with the V-notching as indicated in the LFA 26B management plan. This lack of support for V-notching is not only seen in LFA 26B but in all LFAs of the southern Gulf where V-notching was requested as a management measure.

Prior to the 1999 fishing season, fishermen in LFA 26B initiated numerous meetings with DFO to discuss on the lobster conservation measures and to raise concerns about the general unwillingness to conduct V-notching. Fishermen indicated that other conservation measures could be adopted to achieve the same result of doubling E/R, without using V-notching. All agreed that E/R could be increased by reducing exploitation rate. It was suggested that exploitation rate could be reduced by changing or regulating some aspects of the fishing gear therefore, reducing fishing effort. Unfortunately, there was little quantitative information describing the fishing effort in LFA 26B.

To improve the knowledge on fishing effort and to provide the quantitative information required for further management discussions, a fishing effort survey was initiated.

The questionnaire was designed jointly with local fishermen, DFO Science and Management representatives. The objective was to collect information on the different gear types, designs and dimensions in LFA 26B. The results are presented in this report with an historical overview of the lobster landings for the southern Gulf and LFA 26B. The results are presented in tables and figures with minimal interpretation and without any pre-assigned management scenarios. We hope this information can be used by fishermen, fisheries managers and biologists to better understand the complexity of the fishing effort in LFA 26B, and to improve fishery management.

2. Description of the lobster fishery

2.1 Lobster Fishing Areas and management regime

The southern Gulf of St. Lawrence is divided in five management zones or Lobster Fishing Areas (LFA) as presented in Fig. 1. The lobster fishery is managed and the effort controlled by using the following three main management tools:

1. a fix length fishing season;
2. a fix number of traps per fishermen (traps being the only fishing gear permitted);
3. a minimum carapace length for male and non-berried female lobsters. Undersize and egg bearing lobsters are returned at sea.

In 1999, the lobster fisheries management regime in the southern Gulf of St. Lawrence was based on two major fishing seasons, three minimum carapace sizes at capture and three maximum number of traps allowed per fisherman (Table 2). In LFA 26B, the lobster fishery takes place during the months of May and June (spring fishing season). The LFA also has the largest legal minimum carapace size at 70mm (2¾"). A detail description of the lobster fishery in terms of resource status and fishing effort can be found Lanteigne et al. 1998 and Lanteigne 1999.

Trap maximum dimensions are regulated at 125 cm in length, 90 cm in width and 50 cm in height (49.2" x 35.4" x 19.7") and all traps must be equipped with at least one escape mechanism in the parlor compartment. The minimum dimensions of the escape mechanism opening are regulated to 38 mm (1.5") in height by 127 mm (5") in length. However, there are no regulations on the trap internal design (i.e.: number of compartments) and the entrance diameter.

LFA 26B consists of the western coast of Cape Breton, from Aulds' Cove to Meat Cove. It is the smallest of the southern Gulf of St. Lawrence in terms of area (approx. 613 km^2) and number of fishermen (Table 2). Fishermen of LFA 26B represent 7.8% of all the lobster license holders registered in the five LFAs of the southern Gulf of St. Lawrence.

2.2 Lobster landings

Commercial lobster landings in the southern Gulf of St. Lawrence have shown a sharp increase since 1974 from 5,594 t landed to a record high of 22,063 mt in 1990 (Fig. 2, Appendix I). This represents a four-fold increase during a 16 year period. The increase in catches has been observed in all LFAs but with some variations in the year of peak landing. Since 1990, landings in the southern Gulf have shown a steady declining trend. In 1998, 17,158 mt of lobster were landed, which represents a 22% reduction from the peak landing in 1990. Although the 1999 landings are still preliminary (15,930 mt), the steady decline in landings seems to persist. This declining trend was not observed with the same amplitude in all LFAs.

Lobster landings in LFA 26B increased from 405 mt in 1974 to a record high of 1,543 mt in 1991 (Fig. 3, Appendix I). As for the entire southern Gulf, landings have shown a steady decline since. In 1998, landings were 1,098 mt, which represents a 29% reduction from the peak landing in 1991. In

average, lobster catches for LFA 26B represent 6.5% of the annual catch of the all five LFAs of the southern Gulf of St. Lawrence.

Lobster landings are obtained by compiling the data from official sale transactions between fishermen and lobster buyers. These transactions are also indicating the landings sites which generally represent the general fishing areas within the LFAs. By using this information, landings for the LFA 26B can be broken down into its three statistical districts (Fig. 1). Although statistical districts are not equal in size and do not regroup the same number of fishermen, the landings are showing similar annual fluctuations for statistical district 2 and 3 (Fig. 4, Table 3). Landings have fluctuated from 430 to 803 mt between 1994 and 1999, with peak landings in 1991 (724 and 803 mt in statistical districts 2 and 3 respectively).

For statistical district 14, a steady decline was observed, from 23 to 7 mt between 1984 and 1999. It should be noted that Aulds Cove is the only wharf in statistical district 14, regrouping less than eight fishermen in the last 5 years.

3. Material and methods

Following the request of fishermen from LFA 26B, numerous meetings with local fishermen were held during the months of January to April 1999, to discuss the numerous issues related to lobster conservation and fisheries management. During these meetings the idea of conducting an inventory of the current fishing effort in LFA 26B was presented and a questionnaire was designed (appendix II). The questions were aimed at obtaining quantitative information on the different gear types, designs and dimensions used throughout LFA 26B.

The questionnaires were distributed to all fishermen in LFA 26B during a period of approximately three weeks before the 1999 spring fishing season. The documents were presented to fishermen when they were taking possession of trap tags required by law for the identification of each lobster trap.

From this first distribution, approximately 75 questionnaires were completed and returned to the Department of Fisheries and Oceans (DFO, Sciences Branch) for analyses. This represented 30% of the 254 lobster license holders in LFA 26B for 1999. The low rate of participation was deemed insufficient to achieve the objectives. Therefore, all fishermen that did not participate were sent a questionnaire by mail during the lobster fishing season. From this initiative, the total number of questionnaires received increased to 173 (68% of fishermen).

To verify that the participating fishermen were representing an adequate sample of the fishermen population in each statistical district, the age composition obtained from the questionnaire (sample) was compared with the age composition of the 254 license holders in LFA 26B, obtained from in the official DFO lobster licensing database.

Although information on the homeport or community was collected for each fisherman, the analysis was conducted with the data grouped by statistical district.

The information for the different elements of the questionnaire were summarized using three (3) compilation approaches.

1) If the element was unique for each fishermen, the number of fishermen with the element was indicated (ex: age, years of experience, number of traps per string)
2) If a single fisherman could have more than one option or type of the element, the number of occurrences of each option or type of the element was indicated (ex: trap types, trap dimensions, entrance diameters, internal design). Therefore, the number of occurrence is always higher than the number of fishermen that answered the questionnaire. This approach was deemed necessary to fully reflect the fact that one fisherman might possess trap of different types and dimensions.
3) When possible, the total number of traps defined by each element of the questionnaire was also presented. As the first two approaches are to present information on the number of fishermen, the third compilation approach is based entirely on the number of traps.

The results are presented in tables and often repeated in histograms to provide easy visual comparison.

4. Results and discussion

4. 1 Participation level

After two attempts to obtain information from fishermen (initial request and mail-out to fishermen that did not participate the first time), 68% of the license holders in LFA 26B participated. The number of fishermen that answered the questionnaire by homeport and statistical district is presented in Table 4. Based on homeport information compiled in the DFO license holder database, 81%, 55%, and 100% of license holders participated in the survey for statistical district 2, 3 and 14 respectively. The lowest participation rate was observed in statistical district 3 and the highest in statistical district 14 (all 5 fishermen in that statistical district participated). No further attempts were made to increase the participation level. Not all questionnaires were fully completed. Some questions were left unanswered which explain why we give the number of respondents per questions.

4.2 Age composition and year of experience as captain

The age composition of the fishermen that participated in the questionnaire is presented in Table 5 and Fig. 5. The results are showing that 47% of fishermen in statistical district 2 were 40 years of age or less. Only 17% of the fishermen were 40 years or less in statistical district 3 suggesting an older age group of fishermen in that particular statistical district or a possible bias in the sample, as some age groups may not be fully represented.

The low number of fishermen in statistical district 14 does not allow for any detail analysis or interpretations. For that reason, results from the questionnaire were included only in the tables and not in the figures.

To verify that the sample of fishermen that responded to the questionnaire is representative of the actual fishermen population in each statistical district of LFA 26B, the age composition obtained

from the questionnaire was compared with the one obtained from the official lobster licensing database. The average ages calculated from the questionnaire and from the licensing database are both showing that fishermen are older in statistical district 3 and 14 compare with those in statistical district 2 (Tables 5 and 6). However, the comparison of the age composition has revealed a bias in the responding rate. In statistical district 3, the percentage of fishermen that provided information in each age class is showing a trend of increasing participation with age (Fig. 6). This bias suggests that younger fishermen had a lower participation and that the older age groups are over-represented. Any differences between statistical district should be interpreted with caution as it is not known if this bias can have an impact on the results for statistical district 3.

The same age discrepancy between statistical districts was observed with the years of experience as captain of the lobster fishing vessel (Table 7 and Fig. 7). In statistical district 2, 45% of the fishermen that answered the questionnaire started fishing as captain of a lobster fishing vessel before 1986, or had more than 13 years of experience as a captain. This percentage was 74% in statistical district 3 (fishermen with more than 13 years of experience). Approximately half (52%) of the fishermen that answered the questionnaire in statistical district 3 had more than 23 years of experience.

4.3 Fishing practices

A series of questions were aimed at collecting information on fishing practices such as the number of hours required to fish the entire set of traps, the removal of traps in the last two weeks of the season, the quantity of bait used for fishing lobster, the number of traps per string and the number of fishing days per week.

4.3.1 Number of fishing hours per day

The time required for a fisherman to fish an entire set of traps was somewhat consistent in all statistical districts. A total of 98%, 83% and 100% of the fishermen indicated requiring 7 to 10 hours in statistical district 2, 3 and 14 respectively (Table 8). A survey conducted for the 1993 lobster fishery has produced similar results with an average fishing time of 7.5 hours for the entire LFA 26B (Lanteigne, 1999).

4.3.2 Number of traps during the last two weeks of the season

On the question related to the reduction in the number of traps during the last two weeks of the fishing season, 139 (83%) of the 168 fishermen who answered the question indicated not removing any traps before the end of the season (Fig. 8, Table 9).

4.3.3 Quantity of bait used annually

The information gathered on the annual quantity of bait used by fishermen was highly variable, ranging from 200 to 24,000 pounds of bait annually (Table 10). It is doubtful that 2,000 pounds of bait or less is sufficient to conduct regular annual lobster fishing activities. Some fishermen may have misunderstood the question. After discussions with a fishermen, the average calculated weights ranging from 5,460 pounds in statistical district 14 to 11,755 pounds in statistical district 2 were deemed representatives of the fishery's bait requirements. An average annual use of 10,037 pounds

of bait was calculated for the entire LFA 26B which corroborate the 10,058 pounds obtained in a 1993 survey (Lanteigne, 1999).

4.3.4 Number of traps per string

The number of traps per string differs between statistical district. Fishermen in statistical district 2 are generally using more traps per string than in statistical district 3 and 14 (Table 11). In statistical district 2, 86% of the fishermen that answered the questionnaire indicated using 5 to 6 traps per string. In statistical district 3 and 14, the most common trap arrangement was 1 to 2 traps per string with 60 % and 80 % of fishermen respectively (Fig. 9).

4.3.5 Number of fishing days per week

The results from the number of fishing days per week are suggesting some differences between statistical districts. In statistical districts 3 and 14, 82% and 100% of the fishermen are fishing six days per week (Table 12). Only 4% of the fishermen in statistical district 3 are fishing seven days per week. In statistical district 2, there is an almost event split between 6 (48%) and 7 (52%) days per week. It is suggested that Sunday fishing is more prevalent in statistic district 2 than in the other two. However, this situation may have changed in 1999, since most fishermen in statistical district 2 agreed not to fish on Sundays.

4.4 Trap dimensions and designs.

After numerous meetings and discussions, fishermen indicated that they considered trap dimension and design as important factors in lobster trap catchability and efficiency. This section offers an overview of the trap dimensions (length, width and entrance diameter) and the internal design of the trap such as the number of kitchen and parlor. For clarification, the kitchen was defined as the first accessible compartment of the trap, where the bait is normally set. The parlor was defined as the second compartment, accessible from the kitchen and where the escape mechanisms are normally installed. Bait is not normally installed in the parlor.

More than 50% of the 167 fishermen supplying information about their fishing gear have indicated using more than one type of traps so that 291 different answers were received and analyzed (1 to 5 types of trap per fisherman).

4.4.1 Trap length

From 291 occurrences, fishermen indicated using traps ranging from 26 to 48 inches in length (Table 13a). Each trap length category was well represented in each statistical district with 13% within 31-34 inches, 29% within 35-38 inches, 31% within 39-42 inches and 22% with 47-48 inches (Fig. 10a). Statistic district 2 is showing the highest variability in terms of trap lengths with 20% being between 31-34 inches, 34% between 35-38 inches, 25% between 38-40 inches and 15% between 46-48 inches. Statistic district 3 is also well represented in all categories with 93% of the traps distributed evenly in the 4 length categories, ranging from 35 to 48 inches. Although the fishermen are using different sizes of traps within each statistic districts, on average the fishermen in statistic district 2 are using smaller traps (lengthwise) compared to fishermen in statistic district 3 and 14.

A total of 49,947 traps were being used by the 173 fishermen involved in the survey (Table 13b, Fig. 10b). From this total, 28,290 traps were in statistical district 2, 20,157 traps in statistical district 3 and 1,500 in statistical district 14. Most fishermen (more than 78% in any statistical district) indicated having one or two different trap lengths within their individual trap allocation (Fig. 11). The greatest variability was noted in statistical district 3 where 21% of the fishermen had 3 to 4 different trap lengths within their individual trap allocation (Table 13c).

4.4.2 Trap width

Trap width varied from 14 to 30 inches. Traps in the 23-24 inches category represented 54% of the occurrences (Table 14a and Fig. 12a). The second and third most popular widths were 21-22 inches and 25-26 inches with 20% and 10% of the occurrences respectively. Summaries of the total number of traps used in each statistical district with the different trap widths reported are presented in Table 14b and Fig 12b. Most fishermen (79% of the occurrences) indicated having the same trap width for their entire trap allocation (Table 14c).

4.4.3 Trap type

The three types of traps reported were wood, wire mesh and wood-wire combination. In general, the traps constructed of wood are most common in LFA 26B with 57% of the occurrences reported (Table 15a, Fig. 13). They are most popular in statistical district 2 and 14 with 70.8% and 83% of the traps types reported respectively. This was followed by the wood-wire with 24% of the traps in statistical district 2. In statistical district 3, the occurrences of the wood (44%) and wire mesh (40%) traps were almost equal. It is also in statistical district 3 that the highest number of fishermen using wire mesh traps was observed.

The differences between statistical district are also seen in the total number of traps reported for each trap type and presented in Table 15b. The presence of the wood and wood-wire trap types was more prevalent in statistical district 2 with 73% and 22% of the occurrences respectively.

Most fishermen in statistical districts 2 and 14 use only one trap type (Table 15c) for their entire set of traps. The multi-type users are more prevalent in statistical district 3 where 58% of the fishermen are using two types and a small proportion are using up to three types (14%).

4.4.4 Trap internal design

The trap design is presented in terms of the number of parlors and kitchens in the trap. Only minor differences were observed between statistical districts. The most popular design used by fishermen in LFA 26B was the single parlor and single kitchen trap design with 77% of the respondents (Table 16a, Fig. 14a). The second most popular design was the trap with 2 parlors and 1 kitchen representing 19% of the total fishermen involved in the survey.

In addition to the number of fishermen, the number of traps with the 1 parlor – 1 kitchen design was also the highest. In all the 49,642 traps reported in the survey for LFA 26B, 85% had this internal design (Table 16b, Fig. 14b).

The questionnaire also included a question on the number of mechanisms retaining the bait, often called the "spindles" or "bait pins". These mechanisms are only found in the kitchen of the trap. The results presented in table 17 are showing that 71% of the traps reported in LFA 26B were with double spindles. The prevalence was the highest in statistical district 3 with 81% of the trap compare to 65% in statistical district 2. Although characterized by a small sample, the prevalence of double spindles was 40% in statistical district 14.

4.4.5 Entrance diameter (hoop size)

The lobster trap is usually equipped with two circular entrances to the kitchen, located on each side of the trap. The most predominant entrance diameter used by fishermen for the three statistical districts were 5 to 5 1/2 or 5 1/2 to 6.0 inches, corresponding to 52% and 27% of the occurrences respectively (Table 18a). The occurrences of fishermen using traps with a 5 to 5 1/2 inches entrance ranged between 50% and 60% for each statistical district (Fig. 15). The second category of importance was the 5 1/2 to 6 inches diameter as reported by 25.9%, 32.3% and 30.1% of the fishermen in statistical district 2, 3 and 14 respectively.

Information on the entrance diameter was collected from 49,472 traps inventoried during the survey, for all statistical districts combined. The most common entrance (5 to 5 1/2 inches) accounted for 27,387 (55.4%) traps. The results presented as number of traps resemble the results obtained from the number of occurrences (Table 18b, Fig. 15b).

5. Summary

- A sampling bias was identified in statistical district 3 where a trend of increasing participation with age was observed. This bias may have an impact on the overall results for that statistical district.
- The time required to fish an entire set of traps ranged between 7 and 10 hours.
- Most fishermen (83%) do not remove traps in the last two weeks of the fishing season.
- The average weight of bait used during a fishing season was 10,037 pounds.
- The number of traps per string varied between statistical districts with most fishermen using 5 to 6 traps in statistical district 2, 1 to 4 traps in statistical district 3 and 1 to 2 traps in statistical district 14.
- The six days fishing week was more predominant in statistical district 3 and 14. Approximately 50% of the respondents in statistical district 2 were fishing 7 days per week.
- Although a wide range of trap lengths was observed, the longest traps were reported in statistical district 3 and 14.
- Fishermen in statistical district 3 reported having up to 5 different trap lengths as part of their contingent of traps. Only 3 or 2 different trap lengths per fishermen were reported in statistical district 2 and 14.
- Trap width was somewhat consistent between statistical districts and did not seem to increase noticeably with the increasing length of the traps.
- The wood and wood/wire traps were more prevalent in statistical district 2. The wood and wire traps were equally abundant in statistical district 3, and the wood traps were predominant in statistical district 14.

- The most predominant trap design was the single parlor and kitchen with 77% of the traps used for the entire LFA 26B. The second most predominant trap design was the two parlors – one kitchen, with 19% of the traps used by fishermen.
- Approximately 80% of the traps used by fishermen in LFA 26B had entrance diameters ranging from 5 to 6 inches. Only 5.2% of the traps used have entrance diameters larger than 6 inches.

6. Acknowledgements

The authors would like to thank the fishermen association representatives for initiating this project and all the fishermen that took the time to fill this questionnaire. We would also like to give our appreciation to Leroy MacEachern for the technical and logistic support.

7. References

DFO, 1996. American Lobster *(Homarus americanus)*, Southern Gulf of St. Lawrence. DFO Sci. Stock Status Report. 96/115E.

FRCC, 1995. A Conservation Framework for Atlantic Lobster. FRCC95.R.1. Minister of Supply and Services Canada, Cat. No. FS23-278/1 995E.

Lanteigne, M, 1999. Description of the 1993 lobster fishery and fishing fleet of the southern Gulf of St. Lawrence and a retrospective look of the changes that took place from 1984 to 1993. Can. Ind. Rep. Fish. Aquat. Sci., 250.

Lanteigne, M, M. Comeau, M. Mallet, G. Robichaud and F. Savoie, 1998. The American Lobster, *Homarus americanus*, in the Southern Gulf of St. Lawrence (Lobster Fishing Areas 23, 24, 25, 26A and 26B). Can. Stock Assess. Sec. Res. Doc. 98/72.

Table 1. Lobster conservation measures by Lobster Fishing Area (LFA) in the southern Gulf of St. Lawrence from 1998 to 2001.

Lobster Fishing Area (LFA)	1998	1999	2000	2001
LFA 23	MSI* to 67.5mm V-notch**			
LFA 24	MSI* to 65.1mm	MSI* to 65.9mm	MSI* to 66.7mm	MSI* to 67.5mm
LFA 25	MSI* to 67.5mm V-notch**			
LFA 26A	MSI* to 65.9mm V-notch**		MSI* to 66.7mm	MSI* to 67.5mm
LFA 26B	V-notch**			

* *Minimum size increases (MSI)*

** *V-notching on 50% of egg bearing females caught by trap.*

Table 2. Lobster management regime and characteristics in the southern Gulf of St. Lawrence in 1999.

Lobster Fishing Area (LFA)	Minimum carapace size	Fishing season	Number of license holders	Maximum number of traps/fisher
LFA 23	67.5 mm	May - June	749	325
LFA 24	65.9 mm	May - June	637	300
LFA 25	67.5 mm	Mid-Aug. to mid-Oct.	867	250
LFA26A	65.9mm	May-June	767	300
LFA26B	70.0mm	May-June	254	300

Table 3. Lobster landings (t) by statistical district for Lobster Fishing Area 26B, from 1984 to 1999.

Years	Lobster landings by statistical district (metric tons)		
	2	3	14
1984	430.4	429.6	23.1
1985	453.5	464.3	17.1
1986	521.5	590.1	22.8
1987	454.8	572.8	20.8
1988	525.9	643.2	21.1
1989	513.6	600.2	16.3
1990	596.0	670.0	15.1
1991	724.0	802.7	16.1
1992	695.2	705.1	10.4
1993	670.5	769.0	15.1
1994	529.7	574.9	5.6
1995	571.8	575.1	5.4
1996	526.6	593.2	6.3
1997	513.4	560.4	5.3
1998	521.1	569.6	7.4
1999	477.6	496.3	7.3

Table 4. Number of fishermen that answered and returned the questionnaire by homeport and statistical district, for Lobster Fishing Area 26B.

Statistical District	Homeport or community	Number of questionnaires received
14	Aulds Cove*	5
Total for statistical district 14 that answered the questionnaire		5
Registered licence holders in statistical district		*5* **
Participation (%)		*100%*
2	Broad Cove	2
	Margaree Harbour	17
	Grand Etang	21
	LaPointe	9
	Cheticamp	27
	Pleasant Bay	18
	Unknown	1
Total for statistical district 2 that answered the questionnaire		95
Registered licence holders in statistical district		*117* **
Participation (%)		*81%*
3	Creignish	2
	Baxters Cove	11
	McKay's Point	4
	Maryville	6
	Little Judique	9
	Little Judique Harbour	1
	Port Hood	5
	Murphys Pond	10
	Mabou Harbour	4
	Mabou Mines	6
	Finlay Point	2
	Inverness	12
	Pig Cove	1
Total for statistical district 3 that answered the questionnaire		73
Registered licence holders in statistical district		*132* **
Participation (%)		*55%*

* *Only one homeport in statistical district 14.*

** *Licence holders or fishermen have been assigned to the homeport they have indicated when they provided personal information to the DFO licensing office. Although a fisherman has been assigned a homeport in this report, the fishing permit is valid for the entire geographical entity of LFA 26B therefore, may not represent the fishing area of a particular fisherman.*

Table 5. Age composition and basic statistics of the fishermen that answered the questionnaire by statistical district for Lobster Fishing Area 26B, with comparison with statistics obtained from the official licencing database.

Age classes (5 years groupings)	Number of fishermen (and percentage) that answered the questionnaire, by statistical district			*Total for LFA 26B*
	2	3	14	
21-25	5 (5%)			*5 (3%)*
26-30	9 (9%)	4 (5%)		*13 (8%)*
31-35	15 (16%)	4 (5%)		*19 (11%)*
36-40	16 (17%)	5 (7%)	2 (40%)	*23 (13%)*
41-45	15 (16%)	10 (14%)		*25 (14%)*
46-50	9 (9%)	8 (11%)		*17 (10%)*
51-55	8 (8%)	15 (21%)	1 (20%)	*24 (14%)*
56-60	12 (13%)	8 (11%)	2 (40%)	*22 (13%)*
61-65	5 (5%)	12 (16%)		*17 (10%)*
66-80	1 (1%)	6 (8%)		*7 (4%)*
unknown		*1 (1%)*		*1 (1%)*
Average age from questionnaire	*42.8*	*51.1*	*49.0*	*46.5*
Total number of fishermen (n)	*95*	*73*	*5*	*173*
Average age from licencing database (all licenced fishermen)	*42.1*	*48.3*	*49.6*	*45.5*
Total number of fishermen (N)	*117*	*132*	*5*	*254*

Table 6. Actual number of licence holders by age class and statistical district obtained from the official licencing database. The questionnaire participation level for each age class is presented in parenthesis.

Age classes (5 years groupings)	Actual number of fishermen from the licencing database and the estimated participation level (%) in the questionnaire, by age class and statistical district			*Total for LFA 26B*
	2	3	14	
21-25	6 (83.3%)	3 (0%)		*9 (55.6%)*
26-30	13 (69.2%)	5 (80.0%)		*18 (72.2%)*
31-35	19 (78.9%)	14 (28.6%)		*33 (57.6%)*
36-40	19 (84.2%)	16 (31.3%)	2 (100%)	*37 (62.2%)*
41-45	20 (75.0%)	18 (55.6%)		*38 (65.8%)*
46-50	9 (100%)	16 (50.0%)		*25 (68.0%)*
51-55	9 (88.9%)	21 (71.4%)	1 (100%)	*31 (77.4%)*
56-60	13 (92.3%)	17 (47.1%)	2 (100%)	*32 (68.8%)*
61-65	8 (55.6%)	13 (92.3%)		*22 (77.3%)*
66-80		9 (66.7%)		*9 (77.8%)*
Total number of fishermen (N)	*117*	*132*	*5*	*254*

Table 7. Starting years (5 years groupings) as captain of a lobster fishing vessel by statistical district for Lobster Fishing Area 26B.

Years when started as captain of a vessel	Number of fishermen (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
1936-1940		1 (1%)		*1 (0.6%)*
1941-1945				
1946-1950		1 (1%)		*1 (0.6%)*
1951-1955	4 (4%)	2 (3%)		*6 (3.5%)*
1956-1960	2 (2%)	5 (7%)		*7 (4.0%)*
1961-1965	3 (3%)	7 (10%)		*10 (5.8%)*
1966-1970	7 (7%)	12 (16%)	2 (40%)	*21 (12.1%)*
1971-1975	7 (7%)	10 (14%)		*17 (9.8%)*
1976-1980	11 (12%)	8 (11%)	2 (40%)	*21 (12.1%)*
1981-1985	9 (10%)	8 (11%)		*17 (9.8%)*
1986-1990	14 (15%)	9 (12%)		*23 (13.3%)*
1991-1995	21 (22%)	6 (8%)		*27 (15.6%)*
1996-1999	14 (15%)	2 (3%)	1 (20%)	*17 (9.8%)*
unknown	*3 (3%)*	*2 (3%)*		*5 (2.9%)*
Average number of years	*15.7*	*23.9*	*19.3*	*19.3*
Total number of fishermen	*95*	*73*	*5*	*173*

Table 8. Number of hours (grouping of 2 hours) required to fish the entire set of traps by statistical district for Lobster Fishing Area 26B.

Hours required to fish the entire set of traps	Number of fishermen (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
<6 hours		6 (8.3%)		*6 (3.5%)*
7 – 8 hours	67 (70.5%)	29 (40.3%)		*96 (56.1%)*
9 –10 hours	26 (27.4%)	31 (43.1%)	4 (100.0%)	*61 (35.7%)*
11 – 12 hours	2 (2.1%)	6 (8.3%)		*8 (4.7%)*
Total number of fishermen	*95*	*72*	*4*	*170*

Table 9. Percentage of traps being removed by fishermen during the last two weeks of the fishing season, by statistical district for Lobster Fishing Area 26B.

Percentage of traps being removed	Number of fishermen (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
0 %	81 (89%)	54 (75.0%)	4 (80.0%)	*139 (82.7%)*
1-20%	1 (1.1%)	11 (15.3%)		*12 (7.1%)*
21-40%	3 (3.3%)	4 (5.6%)		*7 (4.2%)*
41-60 %			1 (20.0%)	*1 (0.6%)*
61-80%	2 (2.2%)	1 (1.4%)		*3 (1.8%)*
81-100%	4 (4.4%)	2 (2.8%)		*6 (3.6%)*
Total number of fishermen	*91*	*72*	*5*	*168*

Table 10. *Average annual weight of bait used by fishermen in each statistical district for Lobster Fishing Area (LFA) 26B.*

	Statistical district			*Summary for the LFA*
	2	3	14	
Number of fishermen	95	73	5	*173*
Avg. weight of bait per year (lbs.)	11,753	8,055	5,460	*10,037*
Min. weight of bait (lbs.)	200	700	4,800	*200*
Max. weight of bait (lbs.)	24,000	18,000	6,500	*24,000*

Table 11. Number of traps per string used by fishermen in each statistical district for LFA 26B.

Number of traps per string	Number of fishermen (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
1 to 2 traps		43 (60.6%)	4 (80.0%)	*47 (27.6%)*
3 to 4 traps	6 (6.4%)	24 (33.8%)	1 (20.0%)	*31 (18.2%)*
5 to 6 traps	80 (85.1%)	2 (2.8%)		*82 (48.2%)*
7 to 8 traps	8 (8.5%)	1 (1.4%)		*9 (5.3%)*
> 8 traps		1 (1.4%)		*1 (0.6%)*
Total number of fishermen	*94*	*71*	*5*	*170*

Table 12. Number of fishing days per week as reported by fishermen in each statistical district for Lobster Fishing Area 26B.

Number of fishing days per week	Number of fishermen (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
4		1 (1.4%)		*1 (0.6%)*
5		9 (12.5%)		*9 (5.2%)*
6	45 (47.4%)	59 (81.9%)	5 (100.0%)	*109 (63.4%)*
7	50 (52.6%)	3 (4.2%)		*53 (30.8%)*
Total number of fishermen	*95*	*72*	*5*	*172*

Table 13a. Occurrences of the different trap lengths indicated by fishermen in each statistical district for Lobster Fishing Area 26B.

Trap length in inches	Number of occurrences (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
< 31"	2 (1.5%)	1 (0.7%)		*3 (1.1%)*
31-34"	27 (20.1%)	9 (6.5%)		*36 (12.9%)*
35-38"	46 (34.3%)	35 (25.4%)		*81 (29.1%)*
39-42"	36 (26.9%)	46 (33.3%)	5 (83.3%)	*87 (31.1%)*
43-46"	1 (0.7%)	7 (5.1%)		*8 (2.9%)*
47-48"	21 (15.7%)	39 (28.3%)	1 (16.7%)	*61 (21.9%)*
unknown	1 (0.7%)	1 (0.7%)		*2 (0.7%)*
Total number of occurrences	*134*	*138*	*6*	*278*
Average length (inches)	*38.3*	*41.0*	*42.2*	*39.8*

Note: The term "occurrence" represents the number of times any given element of the questionnaire was identified by a fisherman. This means that a single fisherman could provide more than one occurrence of a given element (ex: trap length). This explains why the total number of occurrences is higher than the number of fishermen sampled.

Table 13b. Number of traps for the different trap lengths used by fishermen in each statistical district for Lobster Fishing Area 26B.

Trap length in inches	Number of traps (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
< 31"	600 (2.1%)	48 (0.2%)		*648 (1.3%)*
31-34"	5,804 (20.5%)	692 (3.4%)		*6,496 (13.0%)*
35-38"	10,382 (36.7%)	4,998 (24.8%)		*15,380 (30.8%)*
39-42"	7,240 (25.6%)	8,891 (44.1%)	1,420 (94.7%)	*17,551 (35.5%)*
43-46"	3 (0.01%)	593 (2.9%)		*596 (1.2%)*
47-48"	3,961 (14.0%)	4,760 (23.6%)	80 (5.3%)	*8,801 (17.6%)*
unknown	300 (1.1%)	175 (0.9%)		*475 (1.0%)*
Total number traps	*28,290*	*20,157*	*1,500*	*49,947*

Table 13c. Number of fishermen that indicated having one or more type of trap lengths in each statistical district, for Lobster Fishing Area 26B.

	Number and percentage of fishermen that indicated having one or more different trap lengths, for each statistical district			*Total for LFA 26B*
	2	3	14	
1 length	60 (63.8%)	21 (30.0%)	4 (80.0%)	*85 (50.3%)*
2 different lengths	29 (30.9%)	34 (48.6%)	1 (20.0%)	*64 (37.9%)*
3 different lengths	5 (5.3%)	12 (17.1%)		*17 (10.1%)*
4 different lengths		3 (4.3%)		*3 (1.8%)*
*Total number of fishermen**	*94*	*70*	*5*	*169*

* *Fishermen with unknown trap length were excluded.*

Table 14a. Occurrences of the different trap widths used by fishermen in each statistical district, for Lobster Fishing Area 26B.

Trap width in inches	Number of occurrences (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
<18"		2 (2.0%)		2 (0.9%)
18-20"	1 (0.9%)	10 (9.9%)		11 (5.2%)
21-22"	11 (10.4%)	30 (29.7%)	1 (16.7%)	42 (19.7%)
23-24"	68 (64.2%)	44 (43.6%)	3 (50.0%)	115 (54.0%)
25-26"	17 (16.0%)	3 (3.0%)	1 (16.7%)	21 (9.9%)
27-28"	7 (6.6%)	6 (5.9%)		13 (6.1%)
>28"		2 (2.0%)		32 (0.9%)
unknown	2 (1.9%)	4 (4.0%)	1 (16.7%)	7 (3.3%)
Total number of occurrences	*106*	*101*	*6*	*213*

Table 14b. Count of traps for the different trap widths used by fishermen in each statistical district in LFA 26B.

Trap width in inches	Number of traps (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
<18"		268 (1.3%)		268 (0.6%)
18-20"	300 (1.1%)	1,687 (8.4%)		1,987 (4.1%)
21-22"	3,155 (11.2%)	5,617 (27.9%)	128 (8.5%)	8,900 (18.3%)
23-24"	18,862 (66.7%)	10,041 (49.8%)	900 (60.0%)	29,803 (61.5%)
25-26"	4,028 (14.2%)	470 (2.3%)	172 (11.5%)	4,670 (9.6%)
27-28"	1,345 (4.8%)	1,106 (5.5%)		2,451 (5.0%)
>28"		323 (1.6%)		323 (1.6%)
unknown	600 (2.1%)	645 (3.2%)	300 (20.0%)	1,545 (3.1%)
Total number of traps	28,290	20,157	1,500	48,722

Table 14c. Number of fishermen that indicated having one or more type of trap widths for each statistical district in Lobster Fishing Area 26B.

	Number and percentage of fishermen that indicated having one or more different trap widths, for each statistical district			*Total for LFA 26B*
	2	3	14	
1 width	83 (89.2%)	46 (65.7%)	75.0%	*133 (79.2%)*
2 different widths	9 (9.7%)	21 (30.0%)	25.0%	*32 (18.5%)*
3 different widths	1 (1.1%)	3 (4.3%)		*4 (2.4%)*
*Total number of fishermen**	*93*	*70*	*5*	*168*

* *Fishermen with unknown trap width were excluded.*

Table 15a. Number of occurrences of the different trap types for each statistical district in Lobster Fishing Area 26B.

Trap types	Number of occurrences (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
Wood	75 (70.8%)	59 (44.4%)	5 (83.3%)	*139 (56.7%)*
Wire	4 (3.8%)	52 (39.9%)	1(16.7%)	*57 (23.2%)*
Wood/Wire	25 (23.6%)	19 (14.3%)		*44 (17.9%)*
Others/non specified	*2 (1.9%)*	*3 (2.3%)*		*5 (2.2%)*
Total number of occurrences	*106*	*133*	*6*	*245*

Table 15b. Count of trap types for each statistical district in LFA 26B.

Trap types	Number of traps (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
Wood	20,740 (73.3%)	9,834 (49.1%)	1,420 (94.7%)	*31,994 (64.2%)*
Wire	720 (2.5%)	8,046 (40.2%)	80 (5.3%)	*8,846 (17.8%)*
Wood/Wire	6,330 (22.4%)	1,947 (9.7%)		*8,277 (16.6%)*
Others/non specified	500 (1.8%)	210 (1.0%)		*710 (1.4%)*
Total number of traps	*28,290*	*20,037*	*1,500*	*49,827*

Table 15c. Percentage of fishermen that indicated having one or more type of trap as part of their fishing gear, for each statistical district in LFA 26B.

	Percentage of fishermen that indicated having one or more different trap type, for each statistical district			*Total for LFA 26B*
	2	3	14	
1 type	88.4%	27.8%	80.0%	62.8%
2 types	11.6%	58.3%	20.0%	31.4%
3 types		13.9%		5.8%
Total number of fishermen	*95*	*72*	*5*	*172*

Table 16a. Number of occurrences for the different types of trap interior design used within each statistical district in LFA 26B.

Trap interior design	Number of occurrences (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
1 Parlor- 1 Kitchen	90 (80.4%)	63 (72.4%)	5 (83.3%)	*157 (77.0%)*
1 Parlor - 2 Kitchens	1 (0.9 %)	4 (4.6%)		*5 (2.4%)*
2 Parlors - 1 Kitchen	20 (17.9%)	18 (20.7%)	1(16.7%)	*39 (19.0%)*
2 Parlors - 2 Kitchens	1(0.9%)	2 (2.3%)		*3 (1.5%)*
Total number of occurrences	*112*	*87*	*6*	*205*

Table 16b. Count of traps for the different types of interior trap design used within each statistical district in LFA 26B.

Trap interior design	Number of traps (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
1 Parlor- 1 Kitchen	24,331 (86.0%)	16,376 (82.5%)	1,460 (97.3%)	42,167 (84.9%)
1 Parlor - 2 Kitchens	80 (0.3 %)	961 (4.8%)		1,041 (2.1%)
2 Parlors - 1 Kitchen	3,779 (13.4%)	2,426 (12.2%)	40 (2.7%)	6,245 (12.6%)
2 Parlors - 2 Kitchens	100 (0.4%)	89 (0.4%)		189 (0.4%)
Total	28,290	19,852	1,500	49,642

Table 17. Prevalence of single and double spindles (bait pins) in lobster traps, for each statistical district in LFA 26B.

Number of spindles	Number of traps (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
1	9,900 (34.7%)	3,870 (19.1%)	900 (60.0%)	14,670 (29.2%)
2	18,600 (65.3 %)	16,385 (80.9%)	600 (40.0%)	35,585 (70.8%)
Total	28,500	20,255	1,500	50,255

Table 18a. Number of fishermen for the different trap entrance diameter used in each statistical district in LFA 26B.

Entrance diameter in inches	Number of occurrences (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
< 4.5"	4 (4.0%)	1 (1.1%)		*5 (2.5%)*
4.5 – 4.9"	14 (13.9 %)	6 (6.3%)		*20 (10.0%)*
5 - 5.4"	54 (53.5%)	47 (49.5%)	3 (60.0%)	*104 (51.7%)*
5.5 – 5.9"	26 (25.7%)	27 (28.4%)	2 (40.0%)	*55 (27.4%)*
> 6"	2 (2.0%)	13 (13.7%)		*15 (7.5%)*
unknown	1 (1.0%)	1 (1.1%)		*2 (1.0%)*
Total	*101*	*95*	*5*	*201*

Table 18b. Count of trap for the different trap entrance diameter used in each statistical district in LFA 26B.

Entrance diameter in inches	Number of traps (and percentage) by statistical district			*Total for LFA 26B*
	2	3	14	
< 4.5"	800 (2.8%)	218 (1.1%)		*10,18 (2.0%)*
4.5 – 4.9"	3,950 (14.0%)	792 (3.9%)		*4,742 (9.5%)*
5 - 5.4"	15,568 (55.0%)	10,919 (54.2%)	900 (60.0%)	*27,387 (54.8%)*
5.5 – 5.9"	7,072 (25.0%)	6,076 (30.1%)	600 (40.0%)	*13,748 (27.5%)*
> 6"	600 (2.1%)	1,977 (9.8%)		*2,577 (5.2%)*
unknown	300 (1.1%)	175 (0.9%)		*475 (1.0%)*
Total	*28,290*	*20,157*	*1,500*	*49,947*

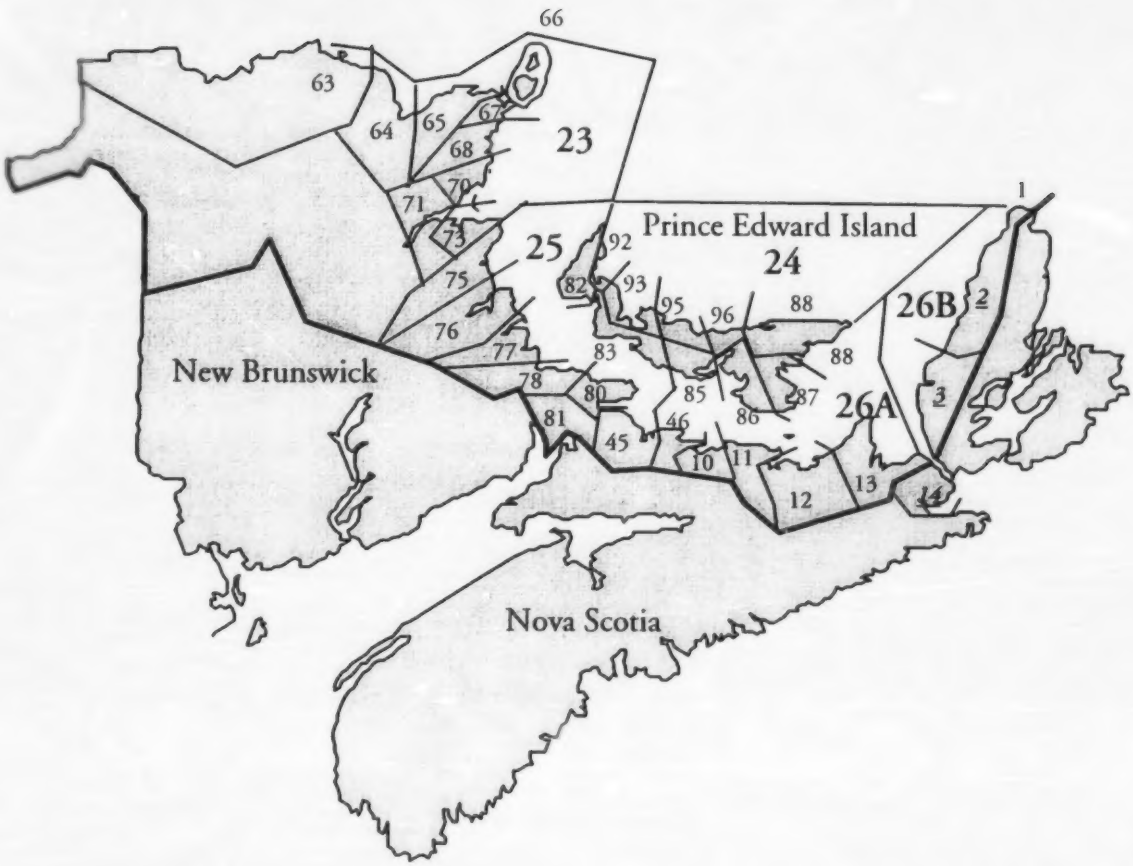


Figure 1. Lobster Fishing Areas (LFA) and statistical districts in the southern Gulf of St. Lawrence. The statistical districts in LFA 26B are underlined.

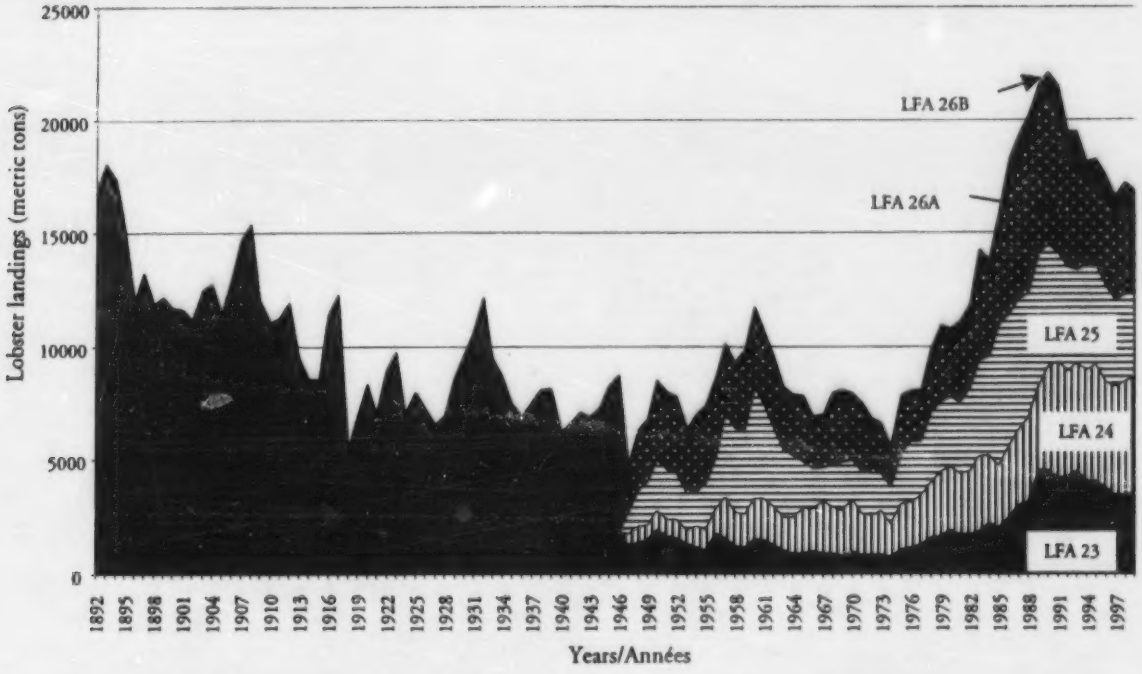


Figure 2. Lobster landings in the southern Gulf of St. Lawrence from 1892 to 1999. Catch data for LFAs 24, 25 and 26A were combined from from 1892 to 1946, as they were not clearly differentiated between LFAs.

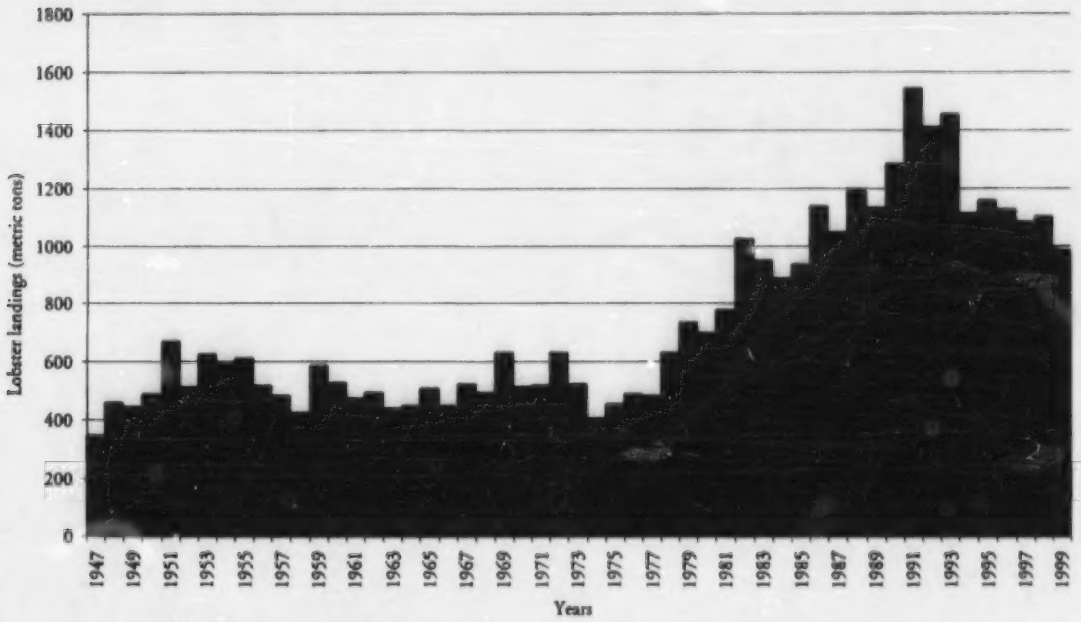


Figure 3. Lobster landings in LFA 26B from 1947 to 1999.

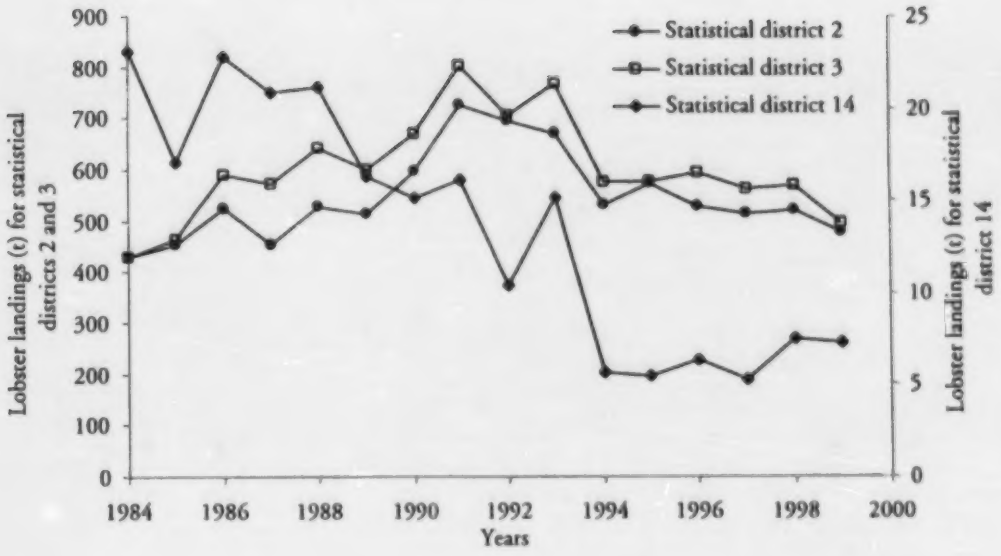
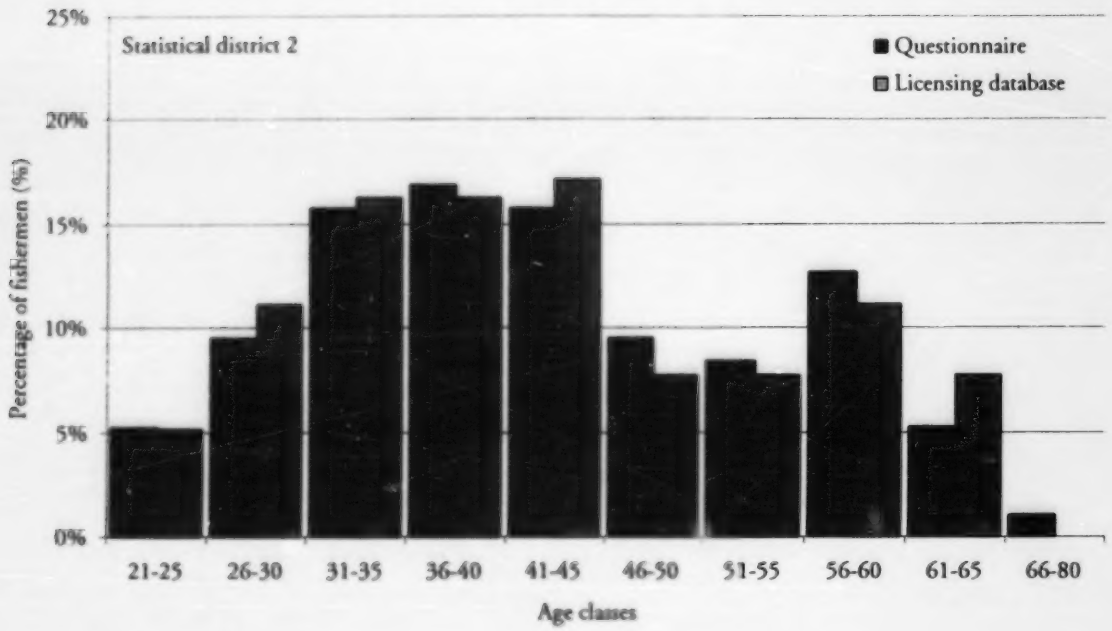


Figure 4. Lobster landings by statistical district in LFA 26B, from 1984 to 1999.



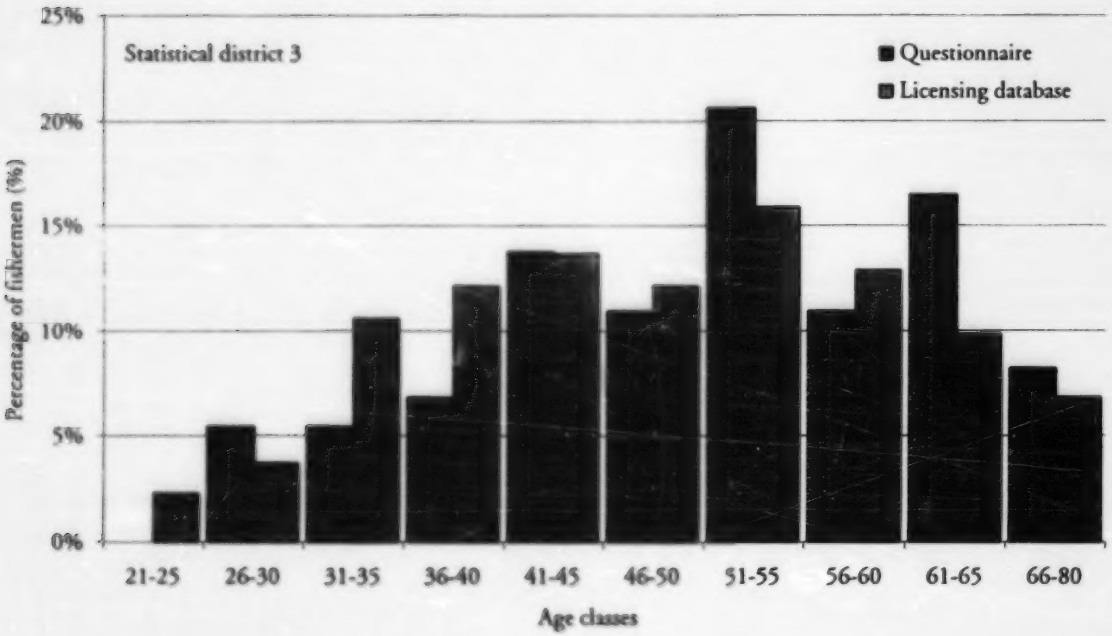


Figure 5. Age composition of the fishermen that answered the questionnaire and comparison with the age composition obtained from the licensing database for statistical districts 2 and 3. Data from statistical district 14 are not presented because of the small number of fishermen (5) available.

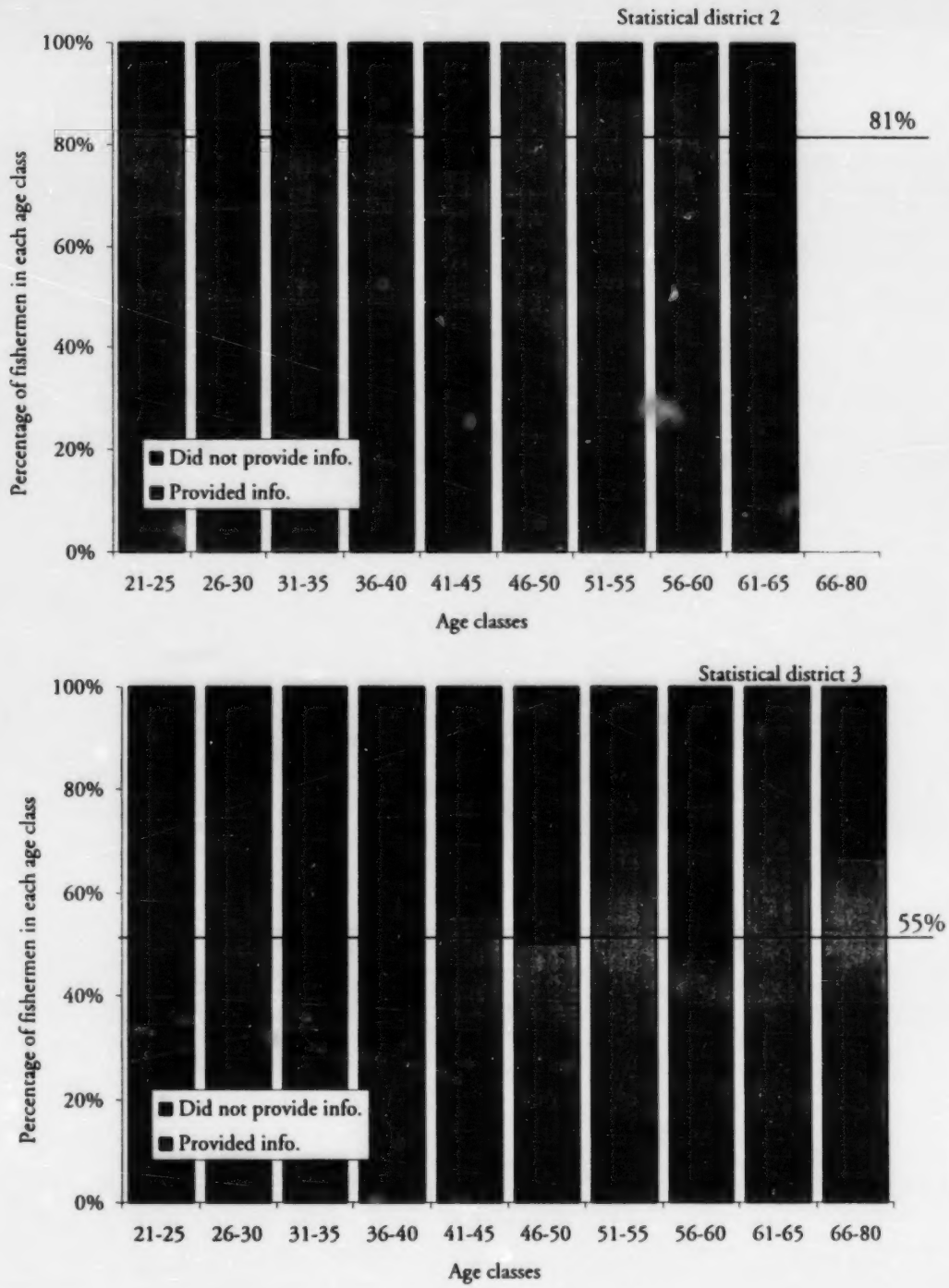


Figure 6. Participation level (%) of fishermen for each age class in statistical districts 2 and 3. The actual number of lobster licence holders and their age were obtain from the official licencing database. The horizontal line indicates the average participation level for the statistical district.

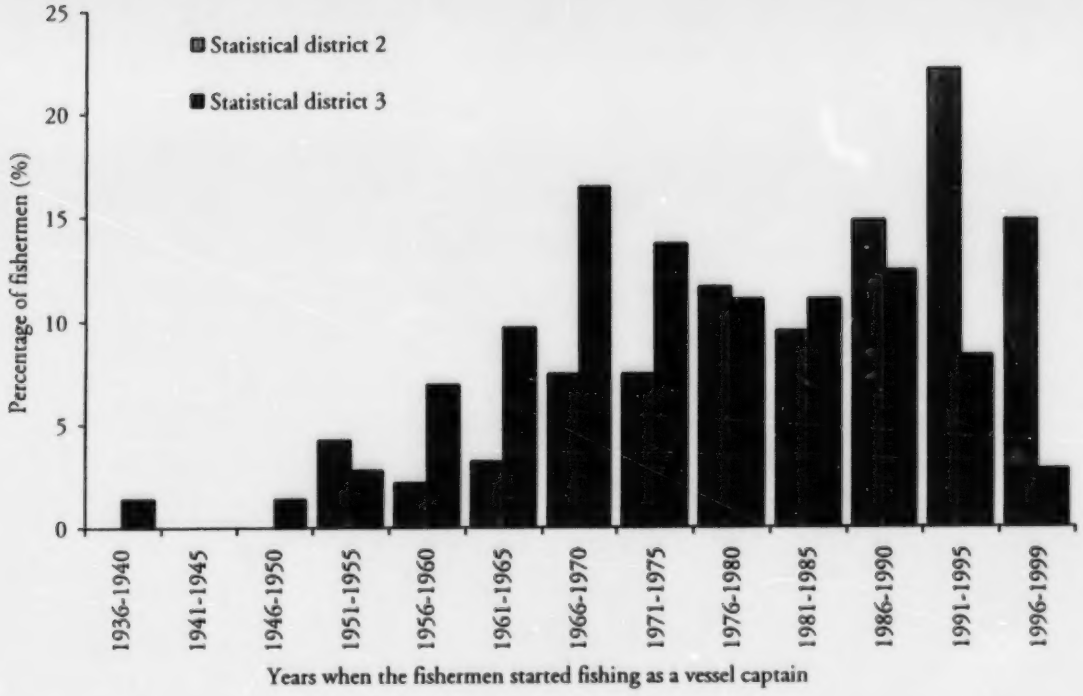


Figure 7. Representation of the number of years of experience as captain of a lobster fishing vessel, by groups of 5 years and by statistical district. Data from statistical district 14 are not presented because of the small effective (5 fishermen).

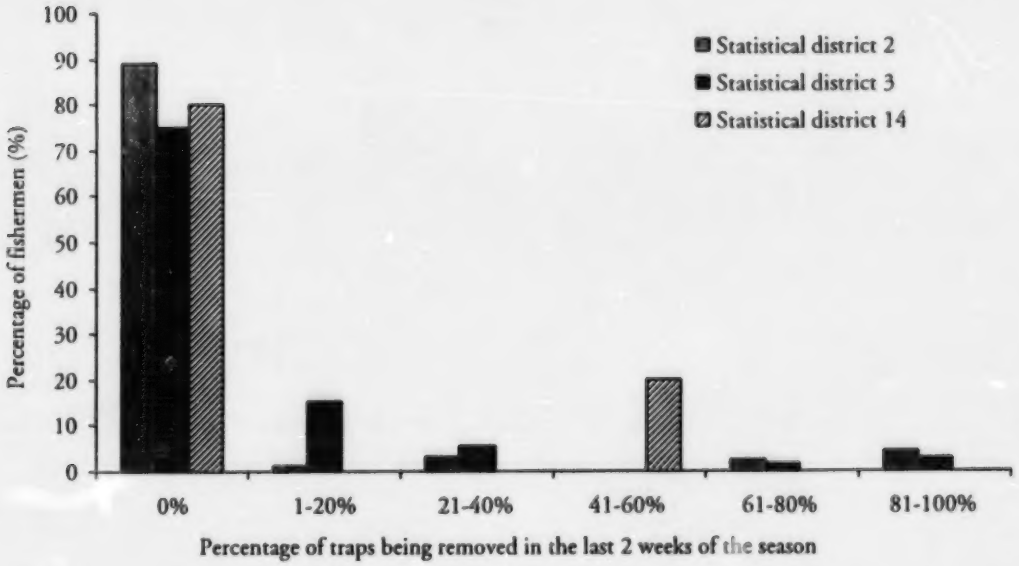


Figure 8. Percentage of fishermen that indicated removing traps in the last two weeks of the fishing season, by statistical district in LFA 26B.

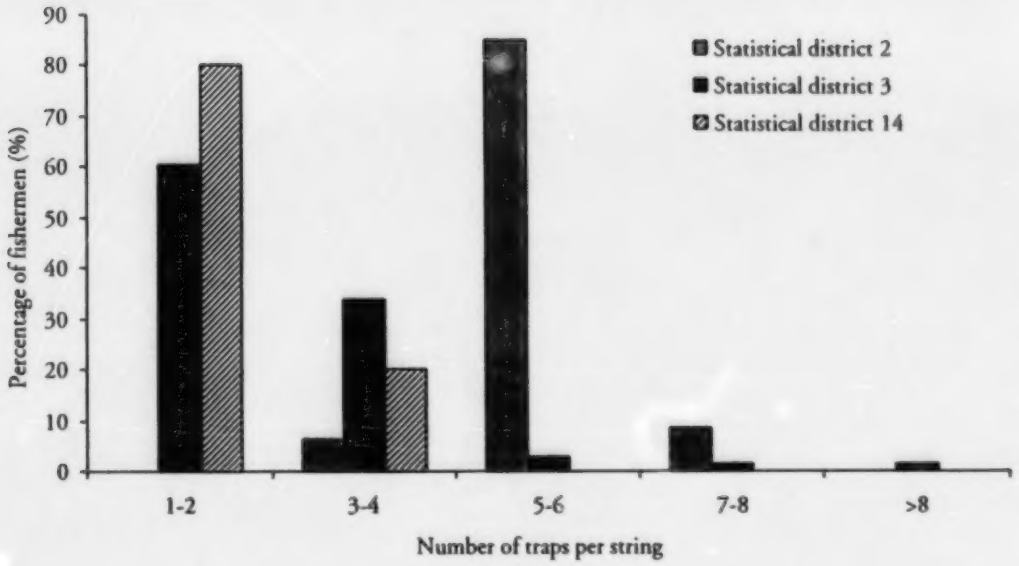


Figure 9. Number of trap per string used by fishermen (%), by statistical district in LFA 26B.

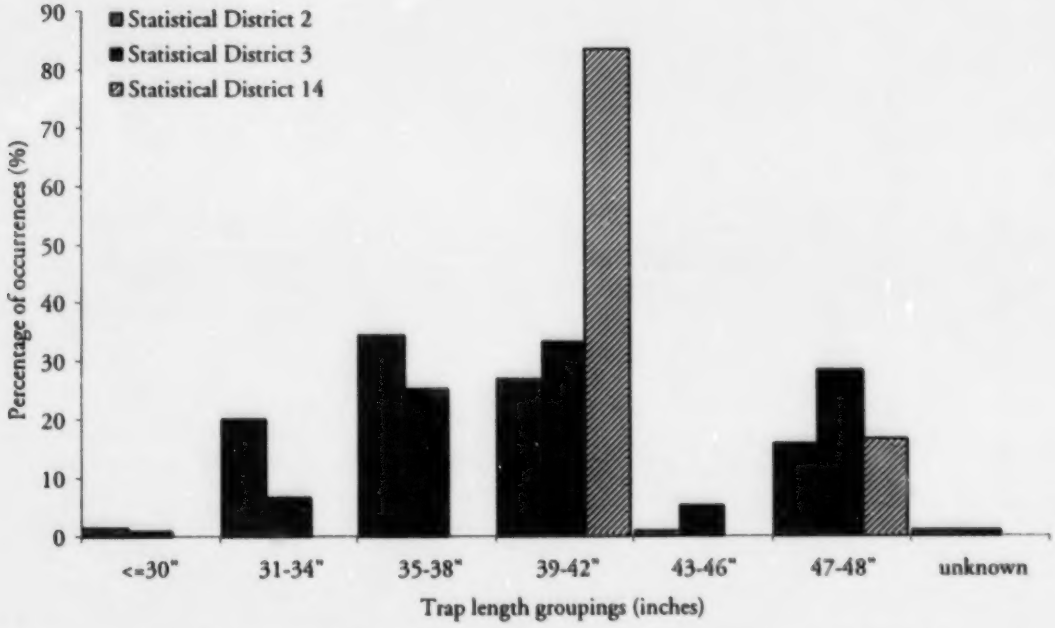


Figure 10a. Relative frequency (%) of the number of occurrences for each trap length grouping, by statistical district in LFA 26B.

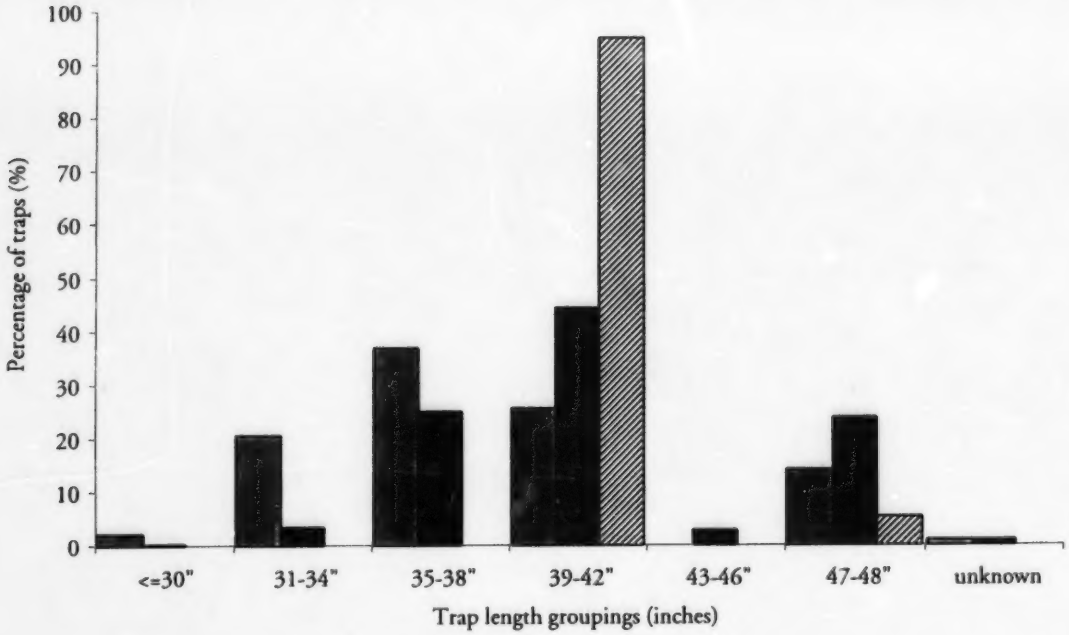


Figure 10b. Relative frequency (%) of the number of traps for each trap length grouping, by statistical district in LFA 26B.

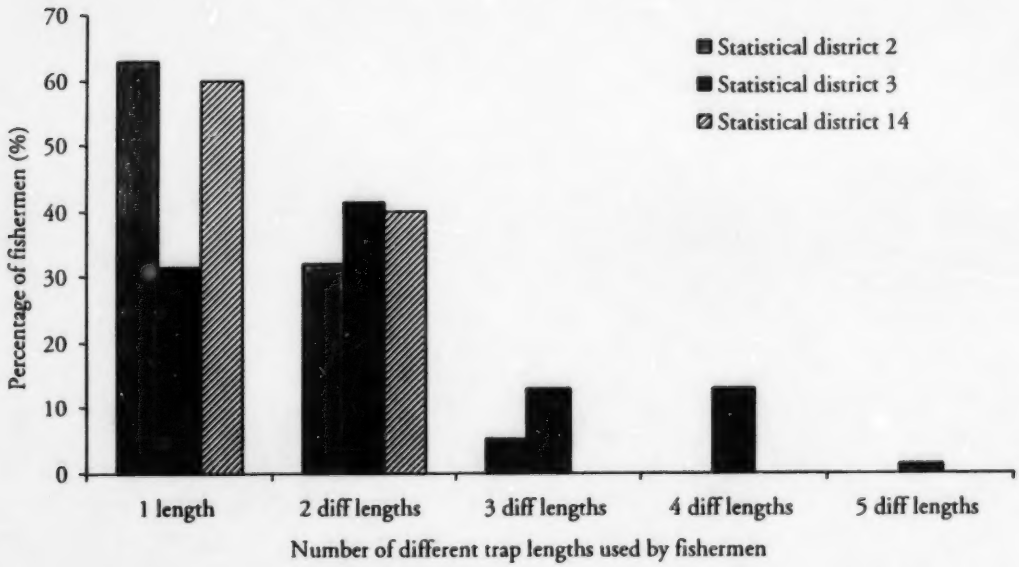


Figure 11. Percentage of fishermen that indicated using one or more trap length, by statistical district in LFA 26B.

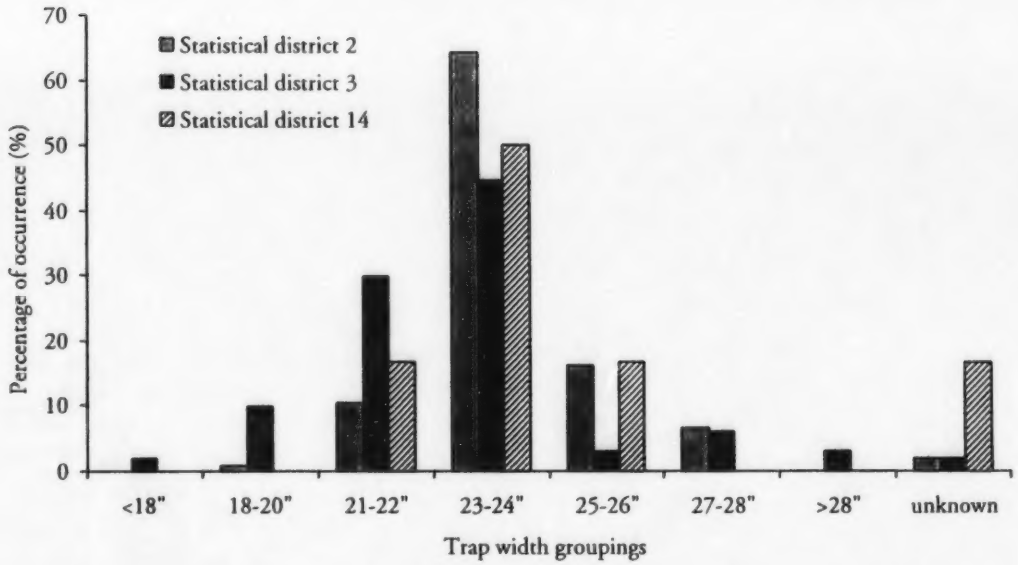


Figure 12a. Relative frequency (%) of the number of occurrences for each trap width grouping, by statistical district in LFA 26B.

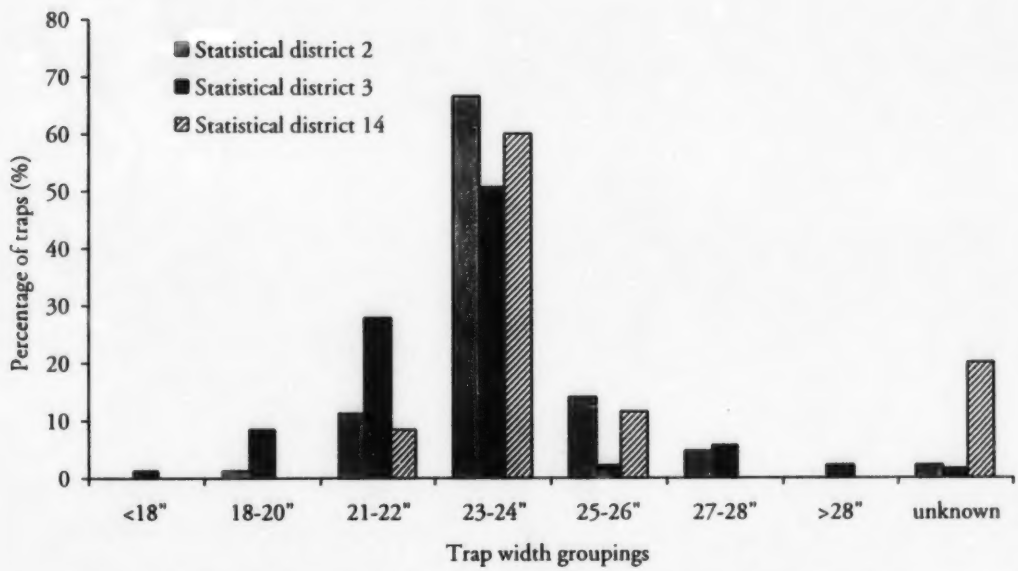


Figure 12b. Relative frequency (%) of the number of traps for each trap width grouping, by statistical district in LFA 26B.

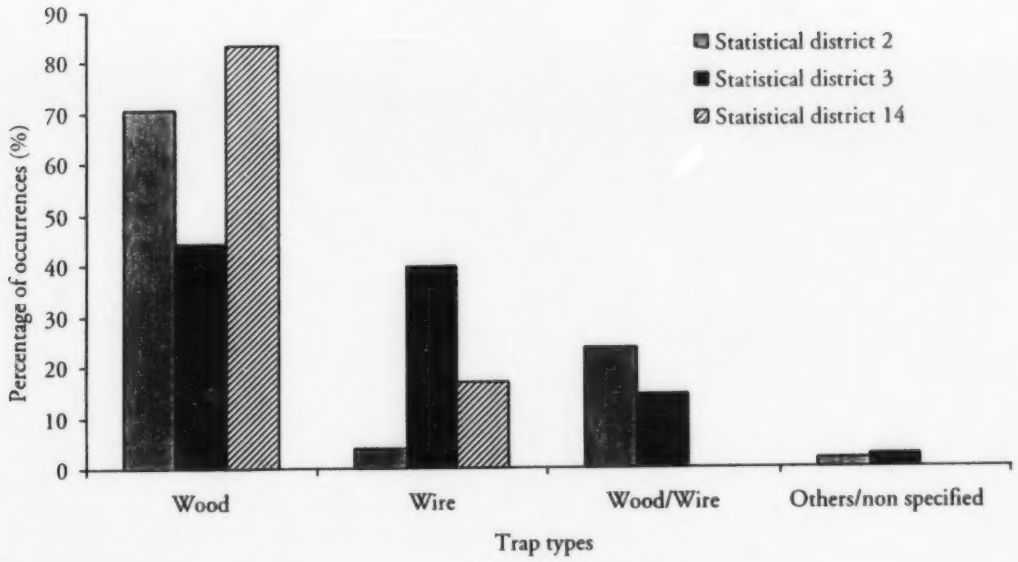


Figure 13. Relative frequency (%) of the occurrence of the different trap types, by statistical district in LFA 26B.

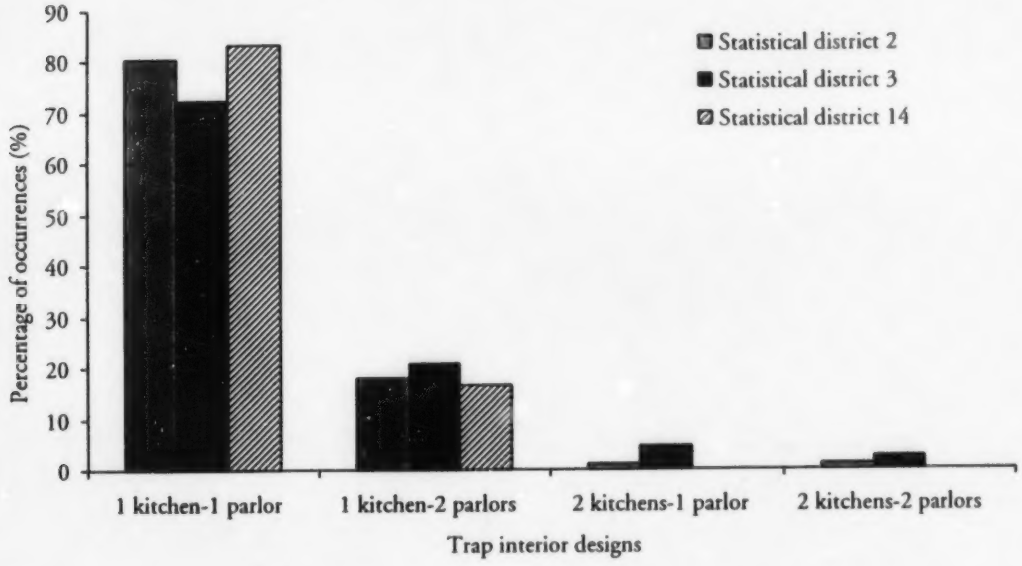


Figure14a. Relative frequency (%) of the occurrence of the different types of interior trap designs, by statistical district in LFA 26B.

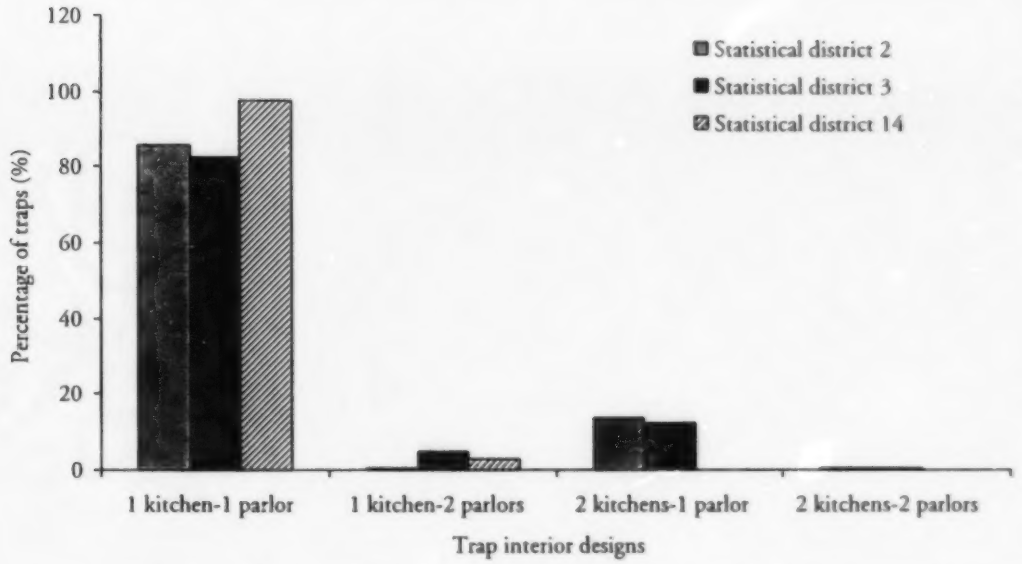


Figure 14b. Relative frequency (%) of the number of traps for each different type of interior trap design used by fishermen, by statistical district in LFA 26B.

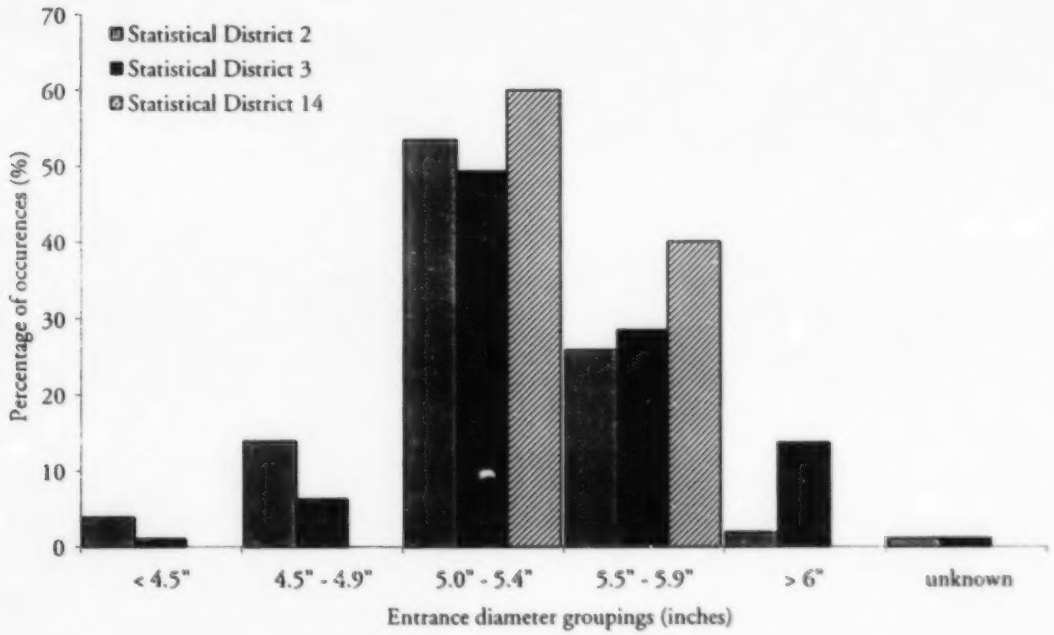


Figure 15a. Relative frequency (%) of the occurrence of the different trap entrance diameter, by statistical district in LFA 26B.

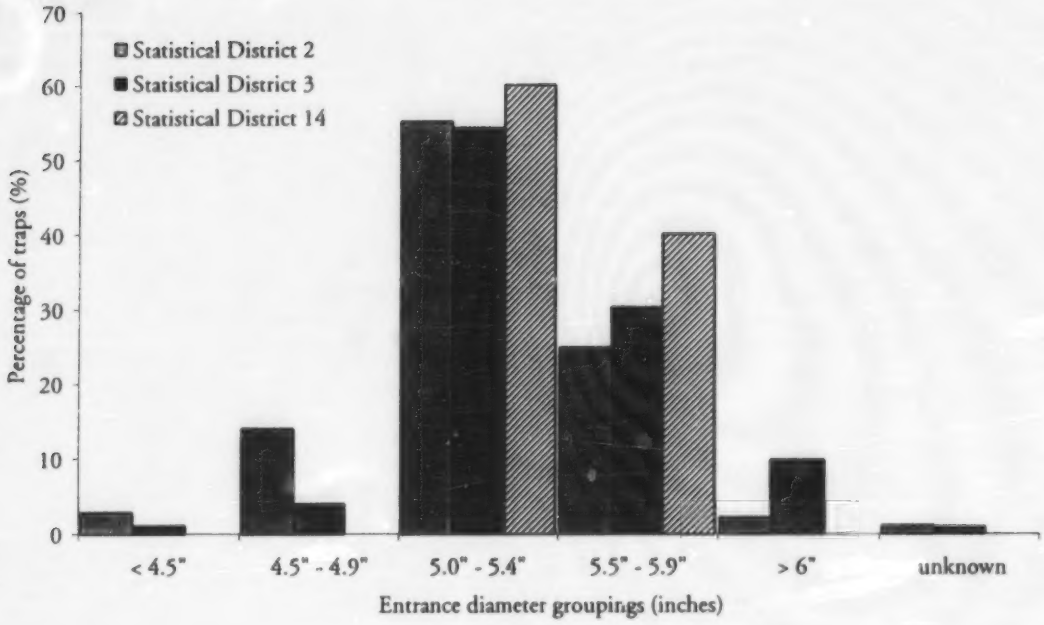


Figure 15b. Relative frequency (%) of the number of traps for each category of trap entrance diameter used by fishermen, by statistical district in LFA 26B.

Appendix I. Lobster commercial landings in metric tons (t) for each Lobster Fishing Area (LFA), from 1892 to 1999. Catch data for LFAs 24, 25 and 26A were combined, as they were not clearly differentiated between LFAs, from 1892 to 1946.

Year	23	24	25	26A	26B	Total
1892	2649		13686		541	16876
1893	2987		14427		645	18059
1894	2756		13996		617	17369
1895	2727		11924		609	15260
1896	2630		8726		670	12026
1897	3444		9122		679	13245
1898	2415		8881		588	11884
1899	1908		9680		585	12173
1900	1718		9417		600	11735
1901	1599		9446		611	11656
1902	1991		8641		538	11170
1903	2298		9427		770	12495
1904	2506		9598		660	12764
1905	2560		8164		739	11463
1906	2414		9663		911	12988
1907	2765		11308		647	14720
1908	2788		12052		533	15373
1909	2315		9347		405	12067
1910	1893		8719		464	11076
1911	1877		8695		677	11249
1912	1664		9433		819	11916
1913	1223		7567		714	9504
1914	1146		6886		579	8611
1915	1416		6511		633	8560
1916	2146		8592		657	11395
1917	2627		9112		557	12296
1918	935		4025		510	5470
1919	1326		4958		617	6901
1920	1286		6335		734	8355
1921	1213		5364		508	7085
1922	1391		6850		780	9021
1923	1520		7454		788	9762
1924	1473		5189		393	7055
1925	1511		5941		506	7958
1926	1413		5249		662	7324
1927	1100		4808		662	6570
1928	1041		5313		590	6944
1929	1366		6748		572	8686
1930	1359		7624		651	9634
1931	1492		8479		639	10610

Year	23	24	25	26A	26B	Total
1932	1598		9868		687	12153
1933	1349		7585		563	9497
1934	1244		6833		599	8676
1935	1006		5870		598	7474
1936	1041		5377		545	6963
1937	1131		5857		536	7524
1938	936		6562		596	8094
1939	1027		6655		443	8125
1940	1007		4931		303	6241
1941	926		5262		459	6647
1942	1113		5602		411	7126
1943	1070		5382		438	6890
1944	1292		5620		390	7302
1945	1557		6235		490	8282
1946	1854		6437		414	8705
1947	1285	497	941	1720	345	4788
1948	1375	738	1565	2206	462	6346
1949	1508	621	1891	2311	445	6776
1950	1919	836	2257	2989	491	8492
1951	1665	712	2131	2813	672	7993
1952	1568	824	2039	2855	512	7798
1953	1298	591	1592	2282	628	6391
1954	1202	905	1489	2819	594	7009
1955	1009	942	1988	2853	611	7403
1956	1765	1055	2268	3011	520	8619
1957	1550	1783	3756	2533	482	10104
1958	1241	1492	3655	2461	426	9275
1959	1148	1426	3760	2893	585	9812
1960	1529	1758	4909	2999	530	11725
1961	1464	1807	4186	2753	475	10685
1962	1265	1685	3520	2658	495	9623
1963	1038	1425	2954	2377	441	8235
1964	898	1562	2711	2257	450	7878
1965	901	1983	1997	2423	511	7815
1966	977	1848	1777	1901	451	6954
1967	914	2232	1515	1795	524	6980
1968	913	2001	1839	2676	495	7936
1969	791	1955	2143	2562	629	8087
1970	974	2266	1754	2416	514	7926
1971	836	1797	1866	2507	519	7530
1972	811	1744	1825	1827	629	6844
1973	868	1890	1622	1719	526	6633
1974	759	1419	1638	1372	406	5594

Year	23	24	25	26A	26B	Total
1975	1077	1979	2247	2105	453	7868
1976	1157	1984	2645	1785	491	8062
1977	1256	2157	2365	1847	487	8112
1978	1612	2382	3096	2166	632	9889
1979	1640	2825	3110	2622	733	10933
1980	1917	2755	3103	2302	700	10780
1981	1732	2657	3155	2771	780	11096
1982	1730	2754	3643	2693	1023	11845
1983	1864	3281	4241	3902	948	14249
1984	2230	2955	4369	3396	883	13834
1985	2026	2701	6230	3927	935	15819
1986	2478	3114	5803	5726	1134	18255
1987	3009	3278	5758	6194	1048	19288
1988	3114	3698	5463	6691	1190	20156
1989	4528	3710	5877	6284	1130	21529
1990	4508	4591	5320	6363	1281	22063
1991	4186	5109	4770	5844	1543	21451
1992	4257	4605	4578	4594	1411	19444
1993	4486	4732	4100	4686	1455	19459
1994	4111	4830	4572	3480	1110	18103
1995	4069	5083	4360	3536	1152	18200
1996	3784	4604	4239	3720	1126	17472
1997	3467	4757	3784	3481	1079	16568
1998	3453	4959	3844	3804	1098	17158
1999	3543	5079	3846	3386	981	16835

Appendix II. Questionnaire for fishermen in Lobster Fishing Area 26B.

1999 Lobster Fishery Questionnaire - Lobster Fishing Area 26B

Fishermen information: *(the questionnaire results will be send to all fishermen in your LFA)*

1. Your age? _____
2. Your homeport for 1999 (wharf location) _____
3. When did you start fishing lobster as a skipper/captain (which year)? _____
4. Your name and address _____
5. How many hours does it take you to fish your entire set of traps?

4☐ 6☐ 8☐ 10☐ 12☐ 14☐ 16☐ 18☐ 20☐ 22☐ hours

Trap information

6. How many traps do you fish with? 300 ☐ other number _____

7. Do you fish a reduced number of traps during the last 2 weeks of June (end of season)? On average, how many traps during these last 2 weeks?

number of traps used in last 2 weeks of June _____

8. How many traps of each of the following types are you going to use during your 1999 fishing season? What are the dimensions of each type? *(For example, if you have all wood traps, but of 2 different sizes, indicate the dimensions for each type under "all wood" on lines 1 and 2).*

(Dimensions in inches)

Trap-types	Number traps	Length	Width	Height	Number of kitchens	Number of parlors	Total number of entrances	Size of entrances hoops
All wood	1							
	2							
	3							
All wire	1							
	2							
	3							
Wire on wood frame	1							
	2							
	3							
Other types specify								

Note: The kitchen is where the bait is normally set. The parlor is where the escape mechanism is normally set.

9. How many spindles (or bait pins) per trap? 1☐ 2☐ 3☐ 4☐

10. How many traps per line (or string) are you setting?

1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☐ 12☐

11. On average, how many days per week are you fishing? 3☐ 4☐ 5☐ 6☐ 7☐

12. On average, how many traps do you lose at sea each year? _____

13. How many pounds of bait have you used during the 1998 fishing season (approximately)? _____